

Effectiveness of Instructional Strategies

Based on Schema Theory on
Attention Deficit Disorder Children

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Abstract

A review of the literature reveals that there are a number of children in the educational system who are characterized by Attention Deficit Disorder. Further review of the literature reveals that there are information processing programs which have had some success in increasing the learning of these children. Currently, an information processing program which is based on schema theory is being implemented in Lincoln County. Since schema theory based programs build structural, conditional, factual, and procedural schemata which assist the learner in attending to salient factors, learning should be increased.

Thirty-four children were selected from a random sampling of Grade Seven classes in Lincoln County. Seventeen of these children were identified by the researcher and classroom teacher as being characterized by Attention Deficit Disorder. From the remaining population, 17 children who were not characterized by Attention Deficit Disorder were randomly selected.

The data collected were compared using independent t-tests, paired t-tests, and correlation analysis. Significant differences were found in all cases. The

Non-Attention Deficit Disorder children scored significantly higher on all the tests but the Attention Deficit Disorder children had a significantly higher ratio of gain between the pretests and posttests.

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CHAPTER ONE

Introduction

This is a study which looks at the gain of students who have been identified as having Attention Deficit Disorder in the Interdisciplinary Skills Program in Lincoln County. The skills of Systematic Comparison, Concept Clarification, and Systematic Decision Making were viewed as tools to remediate the learner characterized by Attention Deficit Disorder and perhaps aid in establishing of a program which would facilitate the learning of these students. Therefore, the focus of this study is the amount of gain that the Attention Deficit Disorder child has within the Interdisciplinary Skills Program.

Rationale for Study

For many years now, teachers have been struggling with designing program which would address the difficulties that students with academic, social, emotional, cultural, and behavioural problems experience. In the seventies these students became the

responsibility of specialized teachers in special classes. The classroom teacher would begin the identification process by making a referral and, if the child was found to be exceptional, then placement in a Special Education class was made. Sensitivity classes were sometimes set up for children with social and/or emotional difficulties. However, if a child was experiencing academic difficulties, there were classes for the general learning disabled. When a child did not meet the criteria for these special classes there was a third option, the resource teacher. This was a more informal program where the resource teacher withdrew the student from his/her homeroom to administer a more individualized program defined by his/her needs. The implicit understanding was that the classroom teacher taught children who were not identified as exceptional but children who were labelled as average.

In the eighties, profound changes were made which the educational community was not prepared to address. Legislation in Ontario according to Bill 82 (Ontario Ministry of Education, 1986) and modification to the funding structure were instrumental in the reidentification of the responsibilities of the regular

classroom teacher. At one time school boards received special grants for setting up self-contained special education classes. A weighting factor for funding had also been added to all students enrolled in special education classes in the seventies. This was no longer the case. Bill 82 eliminated the weighting factor which had at one time encouraged educators to place students in special education classes. This new policy reflected the Ontario Ministry of Education's change in philosophy in the approaches to be used in the education of the exceptional child. The Ontario Ministry of Education now believed that "every exceptional child has a right to be part of the mainstream of education to the extent to which it is profitable" (Ontario Ministry of Education, 1986, p.37).

Currently the classroom teacher has an uncommonly difficult problem. New legislation resulting in changes in philosophy and the restructured funding system has made it necessary for the classroom teacher to accept the responsibility of planning and implementing program which meets the needs of all students. This includes the exceptional students who were at one time under the tutelage of special education teachers in special

education classrooms. Since the number of students with difficulties has not diminished, as have the special classrooms, the onus of intervention has been placed on the shoulders of the classroom teacher. Because this change in responsibility has occurred in a relatively short period of time, many teachers have experienced difficulty in acquiring the knowledge and expertise to effectively deal with these exceptionalities. There is an abundance of literature that a teacher can refer to for ideas about programs for exceptional students. However, the inconsistent and often contradictory opinions present a challenge for a teacher faced with the reality of providing for exceptional students in a classroom.

Definition of Terms

For the purpose of this paper I have defined the following terms:

Attention Deficit Disorder - This definition is based on the video Attention Deficit Disorder by Barkley (1984):

[It is] characterized by a significant delay
in the development of age appropriate control

of behaviour by its resulting in deficits in sustained attention, impulse control rule governed behaviour, and the regulation of activity level in accordance with situational demands. These problem behaviours are particularly evident in settings involving rules for the restriction of behaviour by the child. This disorder is significantly pervasive, has an onset in early childhood, is chronic throughout development, and is not due to mental retardation, severe emotional disturbance, gross brain damage, severe sensory or motor deficits, or severe language delay.

Complex Skills/Interdisciplinary Skills - are repeatable mental actions with underlying procedures which subsume simple skills required to perform the task propounded by the problematic elements of the context. In this study they include systematic decision making, concept clarification, and systematic comparative analysis.

Schema - is a highly structured mental organization of one's knowledge about a particular topic or thing (Northeastern Region, 1988, p.10). There are four types

of schemata: structural, procedural, factual, and conditional. Structural schema refers to the knowledge of frameworks. Procedural schema refers to the knowledge of problem-solving steps. Factual schema refers to the knowledge of specific information. Conditional schema refers to the knowledge of when to use each of factual, structural and procedural schemata.

Schemata - are more than one schema.

The Problem

What is the effect of the instructional use of the Interdisciplinary Skills of Systematic Comparison, Concept Clarification, and Systematic Decision Making on the student identified as having Attention Deficit Disorder? The Attention Deficit Disorder child is characterized by being inattentive, impulsive, and sometimes hyperactive. The inattention of the Attention Deficit Disorder child needs to be addressed if there is to be an increase in learning. The Interdisciplinary Skills Program which has been based on schema theory should improve attending behaviours. Schema theory creates a specific focus for the learner by building

structural, procedural, and conditional schemata. Schema theory enables attention that is specific and localized. Therefore the Attention Deficit Disorder child should experience increased learning because of the awareness of the elements within the focus.

Hypotheses of the Study

H-1. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Comparative Analysis.

H-2. There is a significant difference in performance between Attention Deficit disorder children and Non-Attention Deficit Disorder children on the pretest of Concept Clarification.

H-3. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Decision Making.

H-4. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Comparative Analysis than for Non-Attention

Deficit Disorder children.

H-5. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Concept Clarification than for Non-Attention Deficit Disorder children.

H-6. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Decision Making than for Non-Attention Deficit Disorder children.

Assumptions and Limitations

The study is based on the assumptions that:

1. Attention Deficit Disorder children can make sense out of and store new information but have more difficulty than the normal child unless the information is presented in a highly structured and organized manner. Executive functions should also be attended to for Attention Deficit Disorder children. In other words, the development of schemata for a child characterized by Attention Deficit Disorder should be attended to structurally, procedurally, and conditionally.
2. The Interdisciplinary Skills Program was taught to all

Grade Seven classes in a uniform and unbiased manner by the three Special Assignment Teachers. The Special Assignment Teachers had no knowledge of which students were going to be identified to be the sample for this study and, therefore, no preferential treatment was given to specific students who might be identified.

The study has certain limitations:

1. This study must rely on the skills of the researcher and the classroom teachers in identifying children with Attention Deficit Disorder and children without Attention Deficit Disorder. Definitions and descriptors are still not entirely stable but it is believed that the rating scale used, the interview with the classroom teacher, the researcher's own experience with the raising of an Attention Deficit Disorder child, and the teaching of a number of children identified as having Attention Deficit Disorder will not limit the validity of the research in a major way.
2. There is a slight chance that some of the children identified as having Attention Deficit Disorder are undergoing drug therapy. The researcher tried to ascertain this during the interview but the possibility still exists that the classroom teacher was unaware of

any drug therapy treatment.

3. There is also the possibility that some of the Attention Deficit Disorder children have been involved in some instructional programs designed to facilitate learning outside of the educational system. This could affect the pretest and posttest scores and the amount of gain between them.

4. This study is limited because only Grade Seven students from Lincoln County were sampled.

5. The treatment time was limited to thirty-two hours over an eight-month time frame.

6. There is no way of knowing if the pretest and posttest results are due to the nature of learning or the methodology used or a combination of the two.

7. This study looks only at the extent to which Attention Deficit Disorder children can acquire learnings for Concept Clarification, Systematic Comparison, and Systematic Decision Making. It does not look at whether these skills can be used for coping strategies or even if they can be generalized to other areas of learning.

8. Various teachers implementing this program were not closely monitored for applications of these skills. However, all teachers were encouraged and given

suggestions for applications within subject areas.

9. Because student attendance was not monitored in relation to the modelling and practicing of these skills, there is a possibility that student performance could vary due to attendance regularity.

Summary

The educational system has always had difficulty in meeting the needs of children with Attention Deficit Disorder and specifically facilitating their learning. However, since the change in philosophy concerning exceptional children and the restructuring of the grant policy, the classroom teacher has had a monumental task. She/he has had to shoulder the responsibility for the teaching of these exceptional students, being accountable for both the planning and the implementation of program to facilitate learning for exceptional children. Since Attention Deficit Disorder children are characterized by being inattentive, impulsive, and sometimes hyperactive, program should be planned and implemented which would attend to these characteristics. The Interdisciplinary Skills Program which has been based on schema theory should improve attending behaviours. Schema theory creates a specific focus for the learner by building structural, procedural, and conditional schemata. Since schema theory enables attention that is specific and localized, learning should be increased because of the awareness of the elements within current focus.

Therefore, the purpose of this study is to see if educators can address some of the characteristics of Attention Deficit Disorder children and facilitate their learning through direct instruction intended to develop schemata.

Remainder of the Study

The remainder of the study will be presented as follows: Chapter II will be a review of the relevant literature; Chapter III will describe the methodology used in the study; Chapter IV will record and summarize the findings; Chapter V will be composed of the summary, discussion, conclusions, and recommendations.

CHAPTER TWO

Introduction

Chapter Two will consist of a review and synthesis of the literature relevant to Attention Deficit Disorder and Schema Theory. A short summary of the findings in the literature will be presented at the end of this chapter.

Review of the Literature

The review of related literature describes some of the problems that affect a consensus among educators about what Attention Deficit Disorder is, how it is caused, how to treat it, and what the teacher can do to facilitate the learning of children diagnosed as having this disorder. The theory of schema development, which I have investigated in relation to Attention Deficit Disorder, is one that goes back a number of years to the work of Case (1985) who based much of his work on work done by Piaget and Vygotsky. Since that time, many researchers have believed that information is stored in memory in knowledge structures called schemata. These

schemata were constructed by the learner interpreting new information and either assimilating it, accommodating it, or rejecting it. All schemata are experience related and are highly interrelated. They have active properties that allow the learner to engage in reflection.

This study sought to learn more about Attention Deficit Disorder children and schema development. It examined the causes, treatments, and descriptors of Attention Deficit Disorder and the theory of schema development. In order to create a framework upon which to base a discussion and analysis of the results, the information from related literature was divided into two main sections: Attention Deficit Disorder and Schema Theory.

The related literature discussed in this chapter was selected on the basis of its conceptual relevance to the various dimensions presented in this study. The individual sources and studies were not discussed from a critical perspective, but there was a critical component in the decision-making process when the literature was selected for inclusion in this review.

Attention Deficit Disorder

- The term Attention Deficit Disorder (ADD) replaces a number of earlier labels which included Organic Driveness, Postencephalitic Behaviour Disorder, Restlessness, Learning Disabilities, Conduct Disorder, Brain Damaged Child, Fidgety Phils, Minimal Brain Dysfunction, Hyperkinesis, and Hyperactive Child Syndrome. The American Psychiatric Association (APA), in its 1980 Third Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM 111), was responsible for this change in label and accompanying clarifications. The APA noted that although overactivity may be present in this condition, it usually diminished in adolescence, while attentional difficulties are prominent and usually persist. In fact, heightened activity, while for many children the most obvious characteristic, was not routinely evident in all children exhibiting ADD. For this reason, two subgroups of the ADD condition were identified: ADDH - Attention Deficit Disorder with Hyperactivity, and ADD or ADDNH - Attention Deficit Disorder without Hyperactivity (APA, 1980). In either case, the salient identifying characteristics of children limited by this condition are developmentally inappropriate attention, impulsivity, and for some of these

children, excess motor activity. Levine (1986) expands upon the attentional factor by referring to weakness in selective attention. In other words, the inability to focus on the relevant characteristics of what must be learned is one of the salient indicators of the problem.

Barkley (1984) perceived Attention Deficit Disorder in a similar fashion. He believed that the greatest difficulty that a child with Attention Deficit Disorder had was in the area of attention span and impulse control. His definition for Attention Deficit Disorder was adopted from the Medical College of Wisconsin (1984):

Attention Deficit Disorder is characterized by a significant delay in the development of age appropriate control of behaviour by its resulting in deficits in sustained attention, impulse control rule governed behaviour, and the regulation of activity level in accordance with situational demands. These problem behaviours are particularly evident in settings involving rules for the restriction of behaviour by the child. This disorder is significantly pervasive, has an onset in early childhood, is chronic throughout development, and is not due to

mental retardation, severe emotional disturbance, gross brain damage, severe sensory or motor deficits, or severe language delay. (Barkley, video, 1984)

As many of the symptoms become evident only in a group situation with increased cognitive demands, a clinical diagnosis has not been recommended (APA, 1980; Brown, R.T., 1986). The adults in the child's environment have been considered the most reliable source of input; the teacher's input is considered especially significant due to his/her greater awareness of age-appropriate norms.

The researcher has summarized the factors that would assist in the identification of children with Attention Deficit Disorder. Much of the following has been based on the works of Barkley (1984) and Conners (1969). When describing Attention Deficit Disorder children, three basic areas must be considered: attention, impulsivity and hyperactivity. Although these children may be inattentive and impulsive, they do not necessarily have to be hyperactive as well.

Inattentiveness has probably been the most notable characteristic of Attention Deficit Disorder children.

"Because little learning can take place unless a child can selectively attend, many of these students' most significant problems may be in their deficit in selective attention" (Argulewicz, 1982, p. 23). These children have demonstrated a lag, or immaturity, in their approach to problem solving and a lack of organization in cognitive strategies (Copeland and Weissbrod, 1983; Brown and Wynne 1984). Barkley (1984) has suggested that children with Attention Deficit Disorder learn somehow differently than "normal" children. In fact, he has argued that there is a strong suspicion that these children require more immediate and stronger feedback in order to learn rules and how to follow them. These children tend to become bored easily and are, therefore, easily distracted. Conners (1969) described Attention Deficit Disorder children as children who are inattentive and easily distracted, demanding of immediate attention or feedback or frustration will be evidenced, and who are distracted by and distract other children.

According to Kuzell and Brassington, impulsivity and distractibility have appeared to be attentionally dependent. Attention Deficit Disorder children have demonstrated some difficulty with the ability to stop and

think or reflect on behaviour before acting. They leap impulsively into activities, rush into assignments, and blurt out answers even before a question is finished. There is no thought given to consequences and these children are often immediately sorry. However, Attention Deficit Disorder children are seldom able to make a connection between actions and consequences. These children have difficulty following rules, and it is believed that this stems from the difficulty with consequences already described (Barkley, 1984). In fact, one of the biggest complaints about these children has been their inability to listen, follow through, and complete tasks according to specific rules. These are the children who have difficulty sustaining attention on many tasks for long. Homework is often partly finished, not that they are unwilling to comply but, in fact, frequently have not done so (Barkley, 1984).

Attention Deficit Disorder children may be overactive. They may appear restless, excitable, and fidgety.

Some of the other characteristics of children with Attention Deficit Disorder may be described using descriptors that have been collected by the researcher from a considerable number of readings and from experience with

a doctor attending to the Attention Deficit Disorder of the researcher's child. It has been found that Attention Deficit Disorder may not be pervasive. It may not affect these children's behaviour everywhere. Sometimes these children have been able to watch T.V. or play video games for a long period of time. They often have not misbehaved in novel or unfamiliar situations. It has been found that these children seem to have less difficulty when dealing with adults on a one-to-one basis. Attention Deficit Disorder children seem to have less difficulty complying with directions given by fathers than by mothers. Children with Attention Deficit Disorder function better in situations with more frequent feedback (i.e., Video games give frequent dramatic feedback). About two-thirds of Attention Deficit Disorder children are more aggressive, defiant, oppositional, destructive, deceitful, and often engage in stealing (Barkley, 1984). They have difficulties with peer relationships and tend to have few close friends. Because they tend to be immature, selfish, and egocentric, they gravitate toward younger children. Often they exhibit swift mood changes, exaggerated expression of emotions, temper outbursts, and unpredictable behaviour. Attention Deficit Disorder children have more physical difficulties

than other children. They are clumsy, awkward, and accident prone. They sometimes suffer from enuresis (wetting) and encopresis (soiling) even into late adolescence (Levine (a), 1986). Some have a tendency toward more ear infections, flus and colds.

It has perhaps been a human tendency to initially search for the origin of this condition, hoping that its discovery would effect a cure. However, the information in this area is still confusing and contradictory. At best, research about Attention Deficit Disorder has given direction for future research. Until 1980, there was no consensus as to the operational diagnostic criteria for Attention Deficit Disorder. Scientists, doctors, and researchers did not have a standardized method of identifying this disorder. Today there are still more questions than answers on the causes and treatment of Attention Deficit Disorder. The American Psychiatric Association (APA, 1980) endeavoured to answer some of these questions about Attention Deficit Disorder. They found that it was a relatively common disorder, occurring in as many as six percent of prepubertal children. In only about five percent of its cases was it associated with a diagnosable neurological origin. Children demonstrating

mild or moderate mental retardation, epilepsy, and some forms of cerebral palsy appeared to be predisposed to this condition. It was found to be ten times more common in boys than in girls and appeared to be more common within a family unit than in the general population. ~~*~~Levine (1986) presented several hypotheses with respect to the etiology for either subtype. He referred to genetic link, chemical imbalances related to neurotransmitter substances in the brain, and faulty operation of the frontal lobes of the brain. Kronick (1986) hypothesized that developmentally delayed use of inner language, which under normal conditions governs one's behaviour, may be a causal factor. ~~*~~Coles (1987), a recent researcher, advocated that the Attention Deficit Disorder syndrome is triggered by certain social relationships and experiences acting on a person predisposed to Attention Deficit Disorder. What has appeared clear, however, is that medical experts in the field regard the condition as an illness (APA, 1980) or, at the least, as a process that goes awry (Levine, 1986).

Anyone familiar with the cognitive demands placed on children in the school setting will recognize the obstacles to academic achievement and optimal social development and confidence building that will be precipitated by the

learner characteristics of children experiencing attentional difficulties. The evidence presented in the research literature, with respect to the hurdles faced by such children, is somewhat pessimistic. However, some of the research studies (as will be seen further on in this literature review) have offered hope as well, in the form of various techniques and classroom modifications that may assist in managing or relieving some of the symptoms.

△ Studies have indicated a strong relationship between the demonstration of Attention Deficit Disorder and learning difficulties. Seven times as many children exhibiting symptoms of Attention Deficit Disorder experience very much difficulty in all academic areas as compared to normal peers (Holborow & Berry, 1984). The elementary years demand a high level of attention to auditory stimuli (Shroyer & Zentall, 1986) thus placing children with attentional difficulties, with or without accompanying hyperactive behaviours, in a precarious position that appears predisposed to academic failure. It was noted that children displaying Attention Deficit Disorder demonstrated greater difficulty than their normal peers with tasks that were presented over longer periods of time or that were more difficult (O'Brien & Obrzut, 1986).

§ Some findings indicate that the Attention Deficit Disorder condition has a negative impact on learning in group situations, and that individualized programs in a special education setting may be more beneficial (Bohline, 1985). There has been no consensus that situational factors greatly influence the level of hyperactivity (O'Brien & Obrzut, 1986). As well, this particular study indicated that whereas some hyperactive boys become more active as structure increases, others do not.

Evidence has suggested that a number of learning disabled children demonstrate attentional deficits (Krupski, 1980, as cited in Brown & Alford, 1984). While learning disabilities and attentional deficits (with hyperactivity) did not necessarily occur simultaneously, a study by Lambert and Sandoval (1980, as cited in Sandoval & Lambert, 1985) indicated that 43% of the hyperactive children were underperforming. If the attentional deficit is seen to result in achievement significantly below children's assessed intellectual abilities, these children may be labelled learning disabled as well. Research into the reasons that learning disabled children appear unable to benefit from conventional instruction appears to be moving into two prime areas: One involves cognitive

difficulties; the other involves attentional factors (Carnine, D., Gersten, R., Darch, C., & Eaves, T., 1985).

✓ The literature abounds with treatments ranging from biofeedback, fluorescent lighting, special diets, behaviour modification, structured environments, to drug therapy. Any of these or none of these might be the answer. However, a few of these treatments have been found to be more effective and have more scientific credibility than some of the others. Each one still has its drawbacks and limitations but the effectiveness of all cannot be discounted.

✓ Drug therapy, such as stimulants, tranquilizers, and antidepressants, is by far the most commonly used and thoroughly researched approach to Attention Deficit Disorder therapy. "To date between 400 and 500 articles on stimulant drug use with hyperactive children have appeared; this is more research than has been done on any other group" (Barkley, 1984). Drug therapy does not appear to work with all Attention Deficit Disorder children; in fact, it has been shown to be effective with only about two-thirds of the children (Barkley, 1981).

✓ Diet interventions are perhaps fraught with as much emotion and controversy as is stimulant medication. While,

for a small percentage of families, a change of diet has demonstrated a favourable response¹ through food plans such as the Feingold Diet (O'Brien & Obrzut, 1975), studies generally indicate that the findings differ little in terms of effects on the child from those of placebo studies (Conners, 1980, as cited in O'Brien & Obrzut, 1986).¹ In addition, a government study in 1980 by the National Advisory Committee on Hyperkinesis and Food Additives in the United States refuted the claim that artificial food colourings, artificial flavours, and salicylates produce hyperactivity or learning disabilities in children (O'Brien & Obrzut, 1986).¹

A model of behaviour modification in which behaviour is altered through consequences imposed externally on the child has been shown to be a popular management technique with these children (Snider, 1987). Reports on the efficacy of this technique vary. Levine (1986) suggested that behaviour modification has a useful role to play. He recommended that specific behaviours be targeted, and that reinforcement be consistent, providing the child with monitoring techniques (charts, graphs, etc.) that will provide him/her with the blatant feedback required.¹ Brown (1986) summarized research that stated that the efficacy of

behaviour therapy decreased as the severity of the problem increased, and that in most cases pharmacotherapy was a necessary element of the treatment. In the same article, he stated that the effect of behaviour therapy on children had not been studied beyond a one-year time period. Kronick (1986) suggested that operant behaviour modification often failed due to the nature of the source of the reinforcement - from outside the child - and, thus, it failed to offer the child the opportunity to take a more active role in his/her therapy.

'Cognitive behaviour modification has also been used to treat Attention Deficit Disorder children. It has been suggested that the lack of effective use of inner language may hamper children's attempts to control their behaviour to attend to what is relevant, or to control impulsivity during the learning process, or during social interaction. It was felt, then, that helping children to make conscious use of verbal mediation may lessen the severity of the symptoms of attentional disorders. This type of intervention was illustrated in the Think-Aloud Program, which makes use of verbal mediation to facilitate cognition (Bash & Camp, 1985, Snider, 1987). It has been argued that cognitive behaviour modification has not proven to

generalize, nor to positively affect academic performance. The authors of the Think-Aloud Program reported mixed success, admitting that generalization to the academic areas did not follow as a matter of course (Bash & Camp, 1985).

Deshler, Schumaker & Lenz (1984) emphasized that the goal of education is to develop independent learners who are socially competent people. This is true for those experiencing difficulties as well as for those who do not experience learning difficulties. In this review they supported the teaching of cognitive skills because, "by definition, the learning disabled are disabled in their ability to acquire academic and cognitive skills" (Deshler, Schumaker, & Lenz, 1984 p.109). Cermak (1983) made a strong case for appropriate instruction to assist the learning disabled who, he believed, process information more slowly. The fact that these learners do not attend to salient factors as readily as other learners would lead to the conclusion that storage and retrieval of specific material also suffers. Instruction needs to attend to the slower rate of these learners and to specific attentional factors.

Another source of support for the teaching of specific

strategies comes from Schunk (1989). "Teaching students to use a comprehension strategy by having them verbalize steps is easily implemented in small group reading instruction, and fits well with the suggestion by researchers to teach strategies to students, especially those with learning problems" (Schunk, 1989 p. 20). ~~8~~ Some researchers have suggested that learning disabled children are "strategy inefficient or strategy inflexible" (Carnine, 1985 p. 328). He pointed out that learners need to be taught specific strategies and given lots of practice to internalize them. Sufficient practice should be given such that learners can apply the strategy unaided in new situations. Tarver (1981) suggested that learning disabled students need to be taught how to apply a strategy as well as when to apply the strategy. Carnine (1985) suggests that further research is needed to determine "how instruction can compensate for attention and cognitive deficits so that learning disabled students can learn to benefit from instructional procedures ... but rather, quite different instructional procedures are needed" (Carnine, Gersten, Darch & Eaves, 1985, p. 329).

When Drake (1988) and, to some degree, Samuels and Edwall (1981) looked at attentional problems they

subcategorized them. They believed that the inattentiveness in Attention Deficit Disorder can be looked at under attention or selectivity, alertness, vigilance, and impulsivity. Attention and selectivity were seen as the narrowing focus of perception in which relevant information was attended. Alertness was seen as a state of readiness, whereas vigilance was looked at as the ability to maintain that alertness or readiness. Impulse control was described as the ability to self-direct, self-regulate, and resist outside interferences. Programs for Attention Deficit Disorder children should include strategies which attend to these areas in order to ameliorate the learning of these types of children.

Brown (1984), in his study of cognitive self-control procedures for learning disabled students' inattentiveness, felt that they were able to generalize their learned procedures to a fair extent. He also noted that the student's awareness of strategies increased attention. Although Snider (1987) felt her study in self-monitoring failed to produce significant academic gains, she discovered that Attention Deficit Disorder students attended better when they knew what to attend to rather than just trying to attend more. Some research studies

have suggested that students with learning disabilities do not attend to relevant stimuli and that this lack of selective attention contributes to the learning disorder (Hallahan, Tarver, Kauffman & Graybeal, 1978). Therefore, students with attention deficit disorders must learn to focus and maintain their attention long enough to complete the task (Forster & Doyle, 1989). Shields and Heron (1989) encouraged the use of procedures which would teach organizational skills to students with learning disabilities and found the following:

The competence of students with learning disabilities to understand, manipulate, make decisions about, and complete assigned tasks successfully is not related solely to their academic skill. It also depends on their proficiency to organize content, material, and time in a meaningful way. (p. 8)

In this article, it also suggests that by providing students with a visual representation of the content to be learned, the chance of the content being learned increases.

A number of the articles that have just been described, plus a myriad of others, have been based on information processing theory. In these studies the

learning disabled student is perceived as learning through various stages of cognition such as "encoding, organizing, storing, retrieving, comparing, and generating (reconstructing) information. These stages also include higher- and lower-order processes (e.g., mechanisms that regulate and deploy relevant skills versus elementary processing components)" (Swanson 1987, p. 155). In other words, learning disabled children's learning is viewed as interaction between executive routines, cognitive processes, and knowledges. This interaction may involve "organization and elaboration of information, ... conscious awareness of cognitive processes and attentional capacity constraints" (Swanson, 1987, p. 155). In addition, Brown (1984) and Jones et.al. (1986) suggest that the learning disabled student's metacognition can be enhanced to increase the learner's understanding of knowledge. Metacognitive knowledge, which is the learners' awareness and knowledge of their own learning processes, as well as their abilities and tendencies to control those processes during learning, "is viewed as providing mental input to the executive system, which in turn organizes and mobilizes relevant information-processing skills and subskills" (Swanson, 1987, p.156). The executive function capability

which is the ability to weigh and choose from several strategies and which also involves the combining of relevant prior knowledge is difficult to impart (Swanson, 1987, p.157). However, when information-processing training includes self-monitoring or self-regulation and certain of the subprocesses are familiar, then training attempts are successful (Swanson, 1987, p.159).

Many of the articles and readings which have been addressed so far have talked about the use of strategies and procedures to ameliorate the learning difficulties of Attention Deficit Disorder children or children with learning disabilities. Discussion of organizing, focusing, and attending strategies have shown in many cases, but not all, that academic improvement was made.

Schema Theory

The search of the literature revealed that, as yet, no purposeful attention has been given to schema theory as an educational treatment for Attention Deficit Disorder. In his 1989 article, Shields suggested the use of visual representations of content as a way to increase learning. It appears that the instructional propositions of schema theory might be a source of valuable teaching strategies which could be used to assist Attention Deficit Disorder

children in learning to become self-directed. The instructional strategies built on schema theory should address factual organizations, procedures, structural frameworks, and conditional processes of Attention Deficit Disorder learners who suffer from inattentiveness, impulsivity, and sometimes hyperactivity. In the early 1960s a distinctively North American brand of cognitive developmental psychology emerged. It was one that combined the insights of Piaget and Vygotsky with those of the new information processing theory (Case, 1985). In that the individual is viewed as a learner and thinker, special attention was given to the operations of memory looking specifically at the processes involved. Schema theory which involves "interpreting new information and allowing it to enter and become part of the knowledge store" (Kulleseid, 1986, p. 41) has been elaborated on by the information-processing theorists. Piaget's belief was that a self-regulatory mechanism within each individual allowed that individual to assimilate (fit new experiences into existing cognitive structures) and accommodate (revise these new structures to fit the new data) new information through environmental stimulation.

Since Piaget's writing, many believe that information

is stored in memory in knowledge structures called schemata. Jonassen (1987) refines the definition of schema as:

a generalized unit of knowledge that is stored in memory. Prior knowledge consists of schemata which are used to interpret new stimuli and which are altered by the acquisition of new knowledge. They are the basis of...reasoning...enabling us to make inferences or produce new knowledge schemata. (p.2)

These schemata are experience related. Other researchers state that, although schema represent the total of what an individual knows about a topic, they are more than simply collections of information. They are highly interrelated, having active properties that allow the learner to engage in reflection and planful cognitive activities (Jones, Palincsar, Ogle & Carr, 1986).

Due to the active properties of schema, each person's schemata are constantly being revised through the assimilation of new information and the refinement of mental structures to make fullest use of this input.

Schema theory is currently becoming a source of our understanding of listening and writing, problem solving,

and misconceptions in other areas of learning (Jones, Palincsar, Ogle & Carr, 1986). As well, schema theory offers a context for developing conscious procedures that individuals learn and practise to improve comprehension in difficult learning situations (Kulleseid, 1986).

Teaching to promote the development of schema should use the prior knowledge of learners as a basis or "use obvious organizational schemes as temporary and externalized models for associating new information" (Glaser, as cited in Maynes, 1989, p. 88). These external organizers are valuable to beginners because many problems can readily be represented in multidimensional structures. Use of these organizers ensures that procedural and structural schema can be made compatible and thus enhance learning. Verbal practice and articulation of these procedures, as theorized by Vygotsky, are responsible for internalizing the schema from external representations (Vygotsky, as cited in Maynes, 1989).

Glaser (1989) believes that what we call an expert is one who has a highly structured and quickly internalized perception. Anderson (1983), as cited by Glaser, says that "expert knowledge is not inert; it is highly proceduralized, conditionalized and compiled" (p. 18).

Beginners may focus on and organize around facts or specifics whereas experts focus and organize around higher levels of knowledge such as principles, theories, and systems (Glaser, 1985).

Recognizing this about schema development, the expert can be used to model procedures to develop structures under specific conditions using knowledge so that novices, too, can become experts. The four types of schemata (factual, procedural, structural, and conditional) which have been identified by researchers and theorists are highly interrelated so that modifications to one type of schema may result in modifications to other types (Jones, 1985). The organization of knowledge, especially in generalized form, enhances retention and requires little storage space in memory. Therefore, the retention of knowledge increases with generalizability.

The nature of schemata has been clarified and described through the identification of a number of structural and processing propositions by Schallert:

Structural Propositions about Schemata

1. Schemata are abstract structures that represent what one holds to be true about the world.
2. The structure of a schema is expressed as a

specific configuration of variables.

3. Some of the variables are obligatory; some are not.
4. A particular schema is embedded in another schemata ~~sic~~ and itself contains subschemata.
5. The configuration of the schemata making up one's knowledge is not static, but dynamic, and changes from moment to moment in response to comprehension (or composition) process demands.
6. Schemata develop; that is, they become more elaborate and more specific, with experience.

Processing Propositions

1. Comprehension (or composition) proceeds as values for the variables of a schema are determined, as a schema is instantiated.
2. Values for variables are determined as a result of the interplay of bottom up (analytical) and top down (holistic) processes.
3. Input information that can be interpreted as a value of a variable is perceived as more significant; information that cannot fulfill a

variable is perceived as less important,
irrelevant or incongruous.

4. Some values for instantiating a variable are more typical than other values.
5. Activated schema guides inferences.
6. Higher-level schemata can constrain the interpretation and acquisition of input information (or the generating of output information). (cited in Maynes, 1990, p. 90)

The Interdisciplinary Skills Program developed by curriculum experts in Lincoln County was designed with schema theory as a basis. Concept Clarification, Systematic Comparison, and Systematic Decision Making were the three skills taught to Grade Sevens across the county. Each of these complex skills was taught through the use of specific procedures. Students were asked to attend to the various steps in each procedure and to verbalize the steps. These procedures subsumed a number of simple skills. Two of these were focusing and organizing skills. Students were expected to attend to specific things once they had focused. Focusing might take the form of a question such as in Systematic Decision Making: Which choice should I

make? or in Systematic Comparison: What are the interesting characteristics? or in Concept Clarification: What is it?

Once the students had focused on the situation, an organizer was built into their schema. This organizer was used to enhance the learner's structural schema. With this structure in mind the learner should have been able to recall the procedure for the complex skill that was being accessed. The program was delivered in such a way that the students were continually being asked to attend to or focus on specific steps in the procedure and parts of the structure. The Interdisciplinary Skills program builds the learner's schemata by using procedures to build procedural schemata, structures to develop structural schemata, and focusing techniques to develop conditional schemata. In order to insure assimilation and accommodation, schemata are built using prior experiences as a starting point. Schemata are taught in conjunction with one another because they are highly interrelated. A change in one results in a change in the others.

Synthesis

Information-processing theorists generally believed that learning specific strategies and gaining knowledge of these strategies seemed to increase learning. They believed that this was true even for Attention Deficit Disorder children.

Schunk (1989) and Bosh and Camp (1985) believed that students should be taught to verbalize the steps to complete a task. It was found that attending to the steps increased learning. Bosh and Camp (1985) found that verbal mediation also helped to control impulsivity. A number of researchers suggested that teaching learners specific strategies and allowing practice for internalizing the strategies increased learning (Carnine, 1985; Kulleseid, 1986; and Tarver, 1981). Attention Deficit Disorder learners' awareness of strategies and knowing what to attend to increased attention and, therefore, learning (Brown, 1984; Snider, 1987; and Swanson, 1987). In their writings, Shields and Heron (1989) encouraged the use of procedures which taught organizational skills. They suggested that giving the learner visual representation would increase learning.

Attention Deficit Disorder children are characterized by being inattentive, impulsive, and sometimes hyperactive. The inattention of Attention Deficit Disorder children needs to be addressed if there is to be an increase in learning. The Interdisciplinary Skills which have been based on schema theory should improve attending behaviours. Schema theory creates a specific focus for the learners by building structural, procedural, and conditional schemata. Schema theory enables attention that is specific and localized. Therefore, there is learning because of the awareness of the elements within the focus. Thus, Attention Deficit Disorder children should have increased learning when educators plan and implement learning episodes based upon schema theory.

Summary

The review of the literature resulted in the following major findings:

1. Attention Deficit Disorder, a disorder which affects approximately six percent of school age children, is a very real problem for educators. It is a problem that educators need to learn to deal with if they hope to develop self-

motivated, self-directed problem solvers.

2. The causes of Attention Deficit Disorder may be many and varied. The literature has not established one as more predominant than another. In fact, many experts feel that most of these are as yet theories.

3. Treatments for Attention Deficit Disorder include biofeedback, fluorescent lighting, special diets, behaviour modification, structured environments, and drug therapy. A few of these treatments have been found to be more effective and have more scientific credibility than some of the others. Each one still has its drawbacks and limitations but the effectiveness of all cannot be discounted.

4. Attention Deficit Disorder children have many problems which may last even into adulthood. They can be inattentive, impulsive, hyperactive, exhibit antisocial behaviours, have learning disabilities, and demonstrate numerous conduct disorders. All of these characteristics can combine to have a very negative impact on the lives of these children. A need has been demonstrated for specific strategies to assist these children in being able to take control of their own lives.

5. Teachers have found some degree of success when using

information processing programs with Attention Deficit Disorder students whereas many other programs have made only temporary improvements.

6. It appears that schema theory can be used as a basis to build information processing programs which can, we hope, ameliorate the child's learning and allow him/her to eventually become a more competent user of selected complex skills.

CHAPTER THREE

Methodology

Introduction

In this chapter the research methodology will be discussed in terms of the population and sample, instrumentation, procedures, data collection, data analysis, and hypotheses.

Population and Sample

The Grade Seven population of the Lincoln County Board of Education was sampled. A random sampling of twelve Grade Seven classes was selected. Of this population 17 students were identified as having Attention Deficit Disorder. From the remainder of the population a pool of students not characterized by Attention Deficit Disorder was established. These students were selected by the classroom teacher as representative of a range of high to low academic ability. Both males and females were included. From this pool 17 students were randomly selected by the researcher to be the sample of students not characterized by Attention Deficit Disorder (See Table 1).

Table 1: Study Sample by Gender

Gender	n

Female	11
Male	23

In Table 1, the number of females ($F = 11$) and males ($M = 23$) for the sample are presented.

Instrumentation

The collection of data was done in three ways. The first instrument used was the Conners' Abbreviated Teacher Rating Scale while the second was a series of questions designed by the researcher to assist in the identification of children characterized by and children not characterized by the Attention Deficit Disorder. The third instrument used was a set of pretests and posttests created by the 1988/1989 Special Assignment Teachers in Lincoln County.

1. The Conners' Abbreviated Teacher Rating Scale was the first data collection instrument used (See Table 2). The abbreviated scale consisted of ten items which were statements about behaviours that the teacher could rate according to the degree of activity on a Likkert type scale. The Conners' Teacher Rating Scale (CTRS) (Conners 1969, 1973) which consisted of 39 items was developed to aid in the diagnosis of hyperactive children. At this time, the label for certain at risk populations was hyperactive whereas, currently, we term it Attention Deficit Disorder. The Conners' Abbreviated Teacher Rating Scale which consists of ten items rather than 39 was created in an attempt to facilitate administration

and interpretation for the teacher. One noted researcher, in particular, felt that the Conners' Abbreviated Teacher Rating Scale was as valid a tool to use for identification as the Conners' Teacher Rating Scale. In fact, it was felt that the same type and quality of information could be gathered from both scales. Cohen (1988) "felt that clinicians choosing to adopt the abbreviated version could do so without significant loss of information" (p.188).

Table 2: CONNERS' ABBREVIATED TEACHER RATING SCALE

Child's Name: _____

 TEACHERS' OBSERVATIONS

Information obtained _____ By _____

 Month Day Year

Observation	Degree of Activity			
	Not at all 0	Just a little 1	Pretty much 2	Very much 3
1. Restless or overactive				
2. Excitable, impulsive				
3. Disturbs other children				
4. Fails to finish things he starts, short attention span				
5. Constantly fidgeting				
6. Inattentive, easily distracted				
7. Demands must be met immediately - easily frustrated				
8. Cries often and easily				
9. Mood changes quickly and drastically				
10. Temper outbursts, explosive and unpredictable behaviour				

OTHER OBSERVATIONS OF TEACHER (Use reverse side if more
 space is required.)

Source: C. Keith Conners, "A teacher rating scale for use in
 drug studies with children." The American Journal of
 Psychiatry, 1969.

Because the abbreviated scale was developed from the Conners' Teacher Rating Scale and has been described as a tool for collecting the same information, validation for using this instrument has been built upon the 39 item Conners' Teacher Rating Scale. Moehle (1989), after completing a literature search on the use of the Conners' Teacher Rating Scale, described it as having played a major role as an objective method of evaluation for over two decades.

The CTRS has been found useful for studying children's attitudes associated with academic achievement (Bruck, 1985), hyperactivity and blood lead levels, (Yule, Urbanoqicz, Lansdown, & Miller, 1984), peer relationships and aggressiveness (Schneider, Ledingham, Byrne, Oliver, & Poirier, 1985), social competence (Beck, Collins, Overholser, & Terry, 1985), behavior problems and maternal depression (Schaughency & Lahey, 1985), fathers' job satisfaction and children's hyperactivity and conduct problems (Barling, 1986), efficacy of various behavioral and cognitive-behavioral therapies (Brasswell, Kendall, Braith, Carey, &

Vye, 1985)...and medication interventions (Conners, 1969; Culcan, 1985; Ottinger, Halpin, Miller, Demisn, & Hanneman, 1985; Sprague, Christensen, & Werry, 1874; Weizman Weitz, Szekely, Tyano, & Belmaker, 1984; Werry, Sprague, & Cohen, 1975). (Moehle, 1989, p.113)

In 1985 Holborow, Berry, and Elkins compared three rating scales for prevalence of hyperkinesis using 1,908 children in elementary schools across various socio-economic backgrounds. The Conners' Teacher Rating Scale, the Queensland Teacher Questionnaire, and the Pittsburg Adjustment Scale were compared and "the findings of prevalence rates on each of the three scales of between 5 and 9 percent is in agreement with other prevalence studies" (Holborow, Berry, & Elkins, 1984, p.415).

Some question has arisen about the stability of the factor structure for the Conners' Teacher Rating Scale. However, this scale has found wide acceptance and is currently being used by the National Institute of Mental Health for drug studies in children. The ten item scale is also being used as part of the children's psychopharmacological battery (Cohen & Hynd, 1986). In a study of 138 six-fourteen year old children from different

ethnic backgrounds, Cohen found differences between Conners' original factor structure and his own findings. He found good agreement on conduct disorder in both studies but felt that his study showed that Conners' factors of attention deficit and hyperactivity were not actually discreet on the 39 item scale. Interestingly enough, Cohen (1986) "noted that the attention deficit/hyperactivity factor found in this study is very similar in composition to Conners' 10-item abbreviated scale (1973), which by design, is very sensitive to changes in the degree of inattention and hyperactivity" (p. 22). Cohen also suggested that the tension-anxiety factors appeared unstable and were actually four discrete factors which were too small to be clinically useful.

In 1988, on a sample of 626 children ranging in age from five to nine years from eight county school systems in the state of Georgia, Cohen again used his factor analysis structure on Conners' Teacher Rating Scale and concluded that:

the results of the present study appear to provide strong support for the clinical utility of the Cohen and Hynd (1986) factor analysis of the Conners' Teacher Rating Scale...provides...an

objective means of diagnosing Attention Deficit Disorder/Hyperactivity. (p. 201)

Moehle conducted a factor analysis of the Conners' Teacher Rating Scale with 284 children between the ages of three and 17 who had been referred to a neuropsychology laboratory in the United States. His comparison of Cohen & Hynd (1986), Conners (1973), and Moehle and Fitzhugh-Bell (1989) resulted in a demonstration internal consistency (Table 3). Moehle summarizes his findings by stating that Conners' Teacher Rating Scale identifies conduct disorder, hyperactivity, and to some degree, antisocial behaviour. Distractibility was also an important factor. "These results support the continued clinical and research use of the CTRS as a brief but sensitive objective instrument for assessing child behaviours..." (Moehle, 1989, p. 123)

2. The second data collection instrument used was a set of questions designed by the researcher to determine, in the interview with the homeroom teacher, his/her agreement or disagreement on the identification of children with and children without Attention Deficit Disorder.

Table 3: Internal Consistency of CTRS Factors Across Studies

Moehle & Fitzhugh-Bell(1989)		Conners(1973)		Cohen & Hynd(1986)	

I. Conduct Disorder	.92	Conduct Disorder	.91	Conduct Disorder	.94
II. Hyperkinetic	.77	Inattentive-passive	.90	A.D.D. Hyperactive	.91
III. Distractible	.78	Tension-anxiety	.42	Anxiety-passivity	.77
IV. Dependent-depressed	.67	Hyperactive	.90	Depression	.71
V. Dyssocial	.78				
VI. Introvert	.39				

Note. Coefficient Alpha was used in the current study.

These questions were designed with the Conners' Abbreviated Teacher Rating Scale, DSM-III criteria, SNAP Rating Scale (a scale developed by Swanson, Nolan, and Pelham to test for Attention Deficit Disorder) and the descriptors for Attention Deficit Disorder as suggested by Barkley (1984) in mind (See Appendix A).

3. Pretests and posttests which were created by the Special Assignment Teachers (teachers hired by Lincoln County to implement the Interdisciplinary Skills Program county wide) at the Intermediate Division to test gains in the Complex Skills of Systematic Comparative Analysis, Concept Clarification, and Systematic Decision Making. See Appendix B which also includes the treatment between the pretests and posttests.

Procedure

This research surveyed 12 randomly selected Grade Seven classes in Lincoln County. The survey was conducted near the end of the school year when all of the pretests, teaching and modelling, and posttests had been completed. The pretest and posttest instruments were the same. The Conners' Abbreviated Teacher Rating Scale was used in the identification of children with Attention Deficit Disorder. As well, the homeroom teacher of each class

was interviewed to assist in the identification of children with and children without Attention Deficit Disorder.

Collection of Data

Data were collected through the observations and use of a checklist (as described under Data Collection Instruments) by the researcher. As well, an interview was conducted with the homeroom teacher concerning the identification of students with and students without Attention Deficit Disorder. Data were also collected from the pretests and posttests that had been administered by the Special Assignment Teachers who were in charge of teaching the Interdisciplinary Skills Program. These pretests and posttests were given at the beginning and the end of the year for the skills of Systematic Comparison, Concept Clarification, and Systematic Decision Making.

Data Analysis

The data were entered into a micro-computer for analysis using the Statistical Package for the Social Sciences (SPSSPC). The analyses included descriptive frequencies, t-tests both paired and independent, and correlations.

Hypotheses

H-1. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Comparison.

H-2. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Concept Clarification.

H-3. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Decision Making.

H-4. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Comparison than for Non-Attention Deficit Disorder children.

H-5. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Concept Clarification than for Non-Attention Deficit Disorder children.

H-6. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest

of Systematic Decision Making than for Non-Attention
Deficit Disorder children.

CHAPTER FOUR

Results

Introduction

In this chapter, the results of the study are discussed. Results are discussed in terms of the descriptive statistics, the independent t-tests, and the paired t-tests. Finally, for exploratory purposes independent t-tests for gender and correlational analysis were run.

Descriptive Statistics

Descriptive statistics give a summary of the statistics for each subject by group. The mean, standard deviations, median, mode, and range are given for the pretests and posttests for systematic decision-making, the pretests and posttests for concept clarification, and the pretests and posttests for systematic comparison. These are presented in Table 4. Independent t-tests.

Hypothesis #1

There is a significant difference in performance between Attention Deficit Disorder children and Non-

Table 4: Descriptive Statistics for Each Sub-Test by Group

Test	Group	M	SD	Median	Mode	Range
Pretest						
Decision	ADD	5.29	2.80	5.00	7.00	0-9
Making	NONADD	10.94	5.48	11.00	7.00	3-24
Posttest						
Decision	ADD	34.47	10.01	34.00	30.00	16-51
Making	NONADD	44.29	6.35	46.00	40.00	29-53
Pretest						
Concept	ADD	1.35	1.06	1.00	1.00	0-3
Clarifi-	NONADD	2.06	1.30	2.00	1.00	0-4
cation						
Posttest						
Concept	ADD	8.94	3.01	9.00	12.00	2-13
Clarifi-	NONADD	11.12	2.03	11.00	12.00	8-15
cation						
Pretest						
Comparison	ADD	7.65	4.96	6.00	2.00	2-19
	NONADD	14.29	3.90	14.00	13.00	7-21
Posttest						
Comparison	ADD	29.71	10.55	32.00	17.00	13-47
	NONADD	39.94	7.24	44.00	44.00	24-48

Attention Deficit Disorder children on the pretest of Systematic Comparison.

In Table 5, the results of the independent t-tests for the pretests of Systematic Comparison are presented. The results show that there is a significant mean difference between the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group ($p < .001$). The mean score for the Attention Deficit Disorder group was 7.65 while the mean score for the Non-Attention Deficit Disorder group was 14.29, a difference of 6.64.

Hypothesis #2

There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Concept Clarification.

The results of the independent t-tests as shown in Table 6 reveal that there is a significant difference between the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group ($p < .046$). The mean score for the Attention Deficit Disorder group was 1.35 while the mean score for the Non-Attention Deficit Disorder group was 2.06, a difference of 0.71.

Table 5: Means, Standard Deviations, and t-Value for
Pretests in Systematic Comparison by Group

Group	M	SD	t	p
Attention Deficit Disorder	7.65	4.96	-4.34	.001
Non-Attention Deficit Disorder	14.29	3.90		

Table 6: Means, Standard Deviations, and t-Value for
Pretests in Concept Clarification by Group

Group	M	SD	t	p
Attention Deficit Disorder	1.35	1.06	-1.74	.046
Non-Attention Deficit Disorder	2.06	1.30		

Hypothesis #3

There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Decision Making.

In Table 7, the results of the independent t-tests for the pretests in Systematic Decision Making are given. The results demonstrate that there is a significant mean difference between the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group ($p < .001$). While the mean score for the Attention Deficit Disorder group was 5.29 the mean score for the Non-Attention Deficit Disorder was 10.94, a difference of 5.65.

In each of the three pretests of Systematic Comparison, Concept Clarification, and Systematic Decision Making, the Non-Attention Deficit Disorder group scored significantly higher than the Attention Deficit Disorder group.

It is interesting to note that the independent t-tests revealed that there was a significant difference in performance on the posttests of Systematic Comparison,

Table 7: Means, Standard Deviations, and t-Value for
Pretests in Systematic Decision Making by
Group

Group	M	SD	t	p
Attention Deficit Disorder	5.29	2.80	-3.78	.001
Non-Attention Deficit Disorder	10.94	5.48		

Concept Clarification, and Systematic Decision Making between the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group.

In Table 8, the results of the independent t-tests for the posttests of Systematic Comparison show that there is a significant mean difference between the two groups ($p < .002$). Since the mean score for the Attention Deficit Disorder group was 29.71 and the mean score for the Non-Attention Deficit Disorder group was 39.94, a difference of 10.23 was found.

The independent t-tests for the posttests of Concept Clarification, found in Table 9, were also significant ($p. < .010$). The mean score for the Attention Deficit Disorder group was 8.94 whereas the mean score for the Non-Attention Deficit Disorder group was 11.12, a difference of 2.18.

In Table 10, the results of the independent t-tests for the posttests of Systematic Decision Making are presented. There is a significant mean difference between the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group ($p. < .001$).

Table 8: Means, Standard Deviations, and t-Value for
Posttests in Systematic Comparison by Group

Group	M	SD	t	p
Attention Deficit Disorder	29.71	10.55	-3.30	.002
Non-Attention Deficit Disorder	39.94	7.24		

Table 9: Means, Standard Deviations, and t-Value for
Posttests in Concept Clarification by Group

Group	M	SD	t	p
Attention Deficit Disorder	8.94	3.01	-2.47	.010
Non-Attention Deficit Disorder	11.12	2.03		

Table 10: Means, Standard Deviations, and t-Value for
Posttests in Systematic Decision Making by
Group

Group	M	SD	t	p
Attention Deficit Disorder	34.47	10.01	-3.42	.001
Non-Attention Deficit Disorder	44.29	6.35		

The mean score for the Attention Deficit Disorder group was 34.47 while the mean score for the Non-Attention Deficit Disorder group was 44.29, a difference of 9.82.

Paired t-tests

Hypothesis #4

There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Comparison than for Non-Attention Deficit Disorder children.

In Table 11, the results of the paired t-tests for the Attention Deficit Disorder group are presented. The results reveal that there is a significant mean difference between the pretests and posttests in Systematic Comparison ($p. < .001$). The mean score for the pretests was 7.65 and the mean score for the posttests was 29.71, a difference of 22.06.

The results of the paired t-tests for the Non-Attention Deficit Disorder group are given in Table 12. These results show that there is a significant mean difference between the pretests and the posttests for this group in Systematic Comparison ($p. < .001$).

Table 11: Means, Standard Deviations, and t-Values for
Pretests and Posttests in Systematic
Comparison for the Attention Deficit
Disorder Group

Test	M	SD	t	p
Pretest Comparison	7.65	4.96	-9.36	.001
Posttest Comparison	29.71	10.55		

Table 12: Means, Standard Deviations, and t-Values for
 Pretests and Posttests in Systematic
 Comparison for the Non-Attention Deficit
 Disorder Group

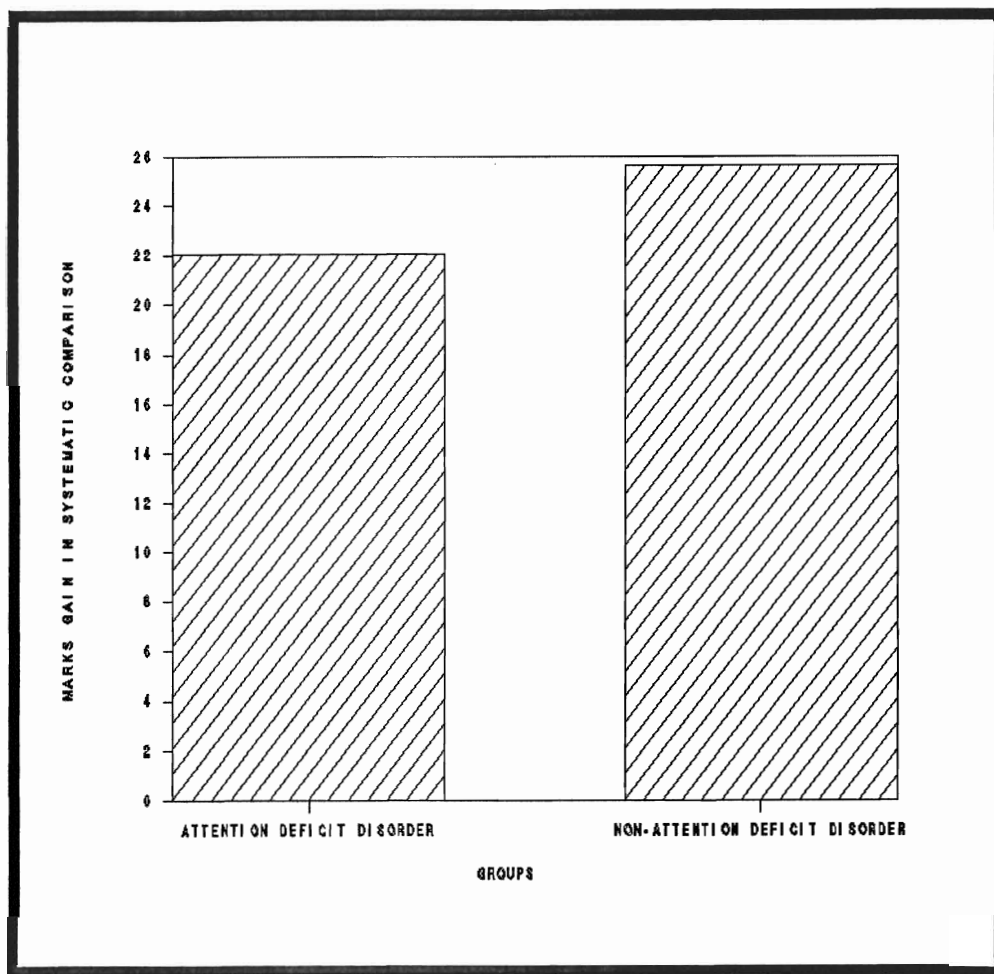
Test	M	SD	t	p
Pretest Comparison	14.29	3.90	-14.49	.001
Posttest Comparison	39.94	7.23		

Since the mean score for the pretests was 14.29 and the mean score for the posttests was 39.94, the difference is 25.65.

The gain in mean scores was significant for the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group. When comparing the gain in scores between the two groups, the difference between the Attention Deficit Disorder group score (22.06) and the Non-Attention Deficit Disorder group score (25.65) is calculated as a difference of only 3.59 (See Figure 1).

It is also interesting to look at the ratio of gain in scores for both the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group for the pretests and posttests of Systematic Comparison. The ratio of gain is found by reducing to lowest terms the fraction created by placing the pretest mean score (Attention Deficit Disorder group 7.65, Non-Attention Deficit Disorder group 14.29) over the posttest mean score (Attention Deficit Disorder group 29.71, Non-Attention Deficit Disorder group 39.94).

Figure 1. Gain in Mean Scores for Systematic Comparison by Group



It was found that the ratio of gain for the Attention Deficit Disorder group was 1:3.88 whereas the ratio of gain for the Non-Attention Deficit Disorder group was 1:2.79, demonstrating that the Attention Deficit Disorder group had a higher ratio of gain on Systematic Comparison.

Hypothesis #5

There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Concept Clarification than for Non-Attention Deficit Disorder children.

The results of the paired t-tests for the Attention Deficit Disorder group on Concept Clarification are presented in Table 13. These results reveal that there is a significant mean difference between the pretests and posttests in Concept Clarification ($p. < .001$). The mean score for the pretests was 1.35 while the mean score for the posttests was 8.94, a difference of 7.59.

Table 14 presents the results of the paired t-tests for the Non-Attention Deficit Disorder group on Concept Clarification.

Table 13: Means, Standard Deviations, and t-Values for
 Pretests and Posttests in Concept
 Clarification for the Attention Deficit
 Disorder Group

Test	M	SD	t	p
Pretest Concept Clarification	1.35	1.06	-10.50	.001
Posttest Concept Clarification	8.94	3.01		

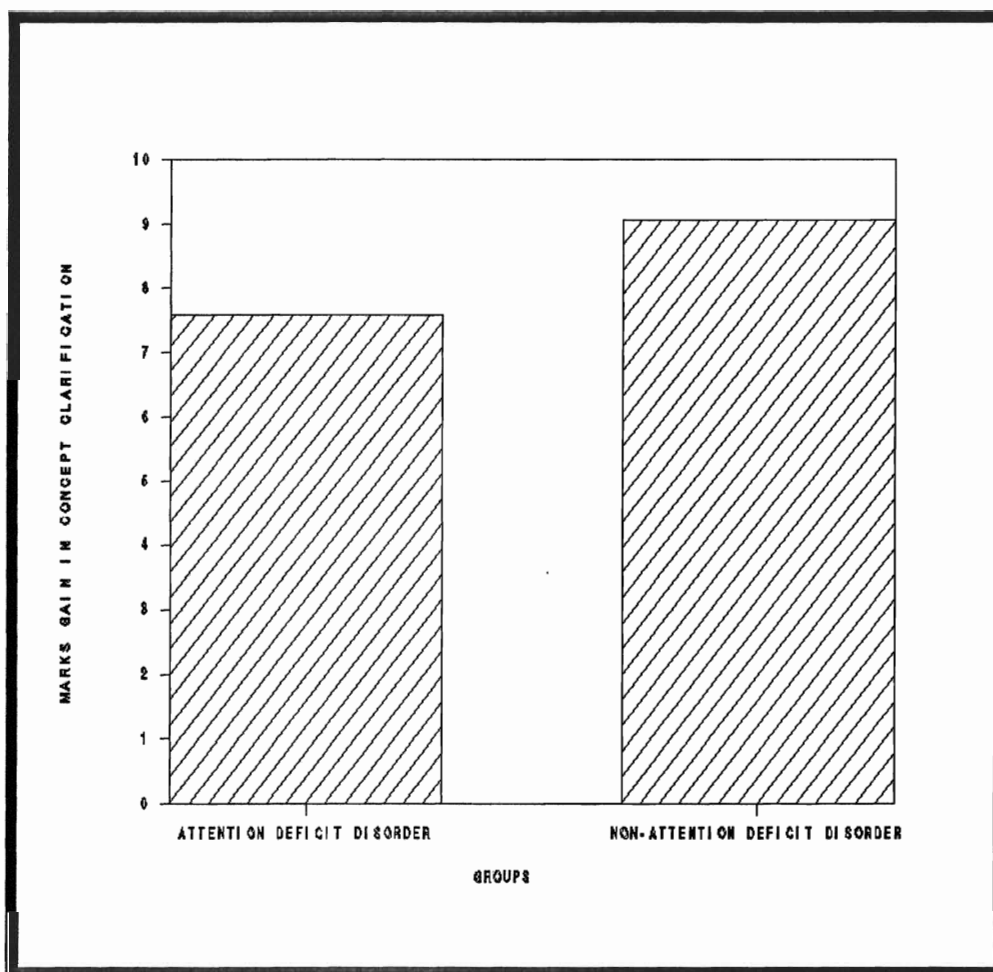
Table 14: Means, Standard Deviations and t-Values for
 Pretests and Posttests in Concept
 Clarification for the Non-Attention Deficit
 Disorder Group

Test	M	SD	t	p
Pretest Concept Clarification	2.06	1.30	-16.21	.001
Posttest Concept Clarification	11.12	2.03		

There is a significant mean difference between the pretests and posttests in Concept Clarification ($p. <.001$). Since the mean score for the pretests was 2.06 and the mean score for the posttests was 11.12, the difference is 9.06. The gain in mean scores for both the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group were significant. When comparing the gain of the Attention Deficit Disorder group (7.59) and the gain of the Non-Attention Deficit Disorder group (9.06), the difference is calculated. The difference is 1.47, in favour of the Non-Attention Deficit Disorder group (See Figure 2).

The ratio of gain in scores for both the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group for the pretests and posttests of Concept Clarification are also interesting to consider. The ratio of gain is found by reducing to lowest terms the fraction created by placing the pretest mean score (Attention Deficit Disorder group 1.35, Non-Attention Deficit Disorder group 2.06) over the posttest mean score (Attention Deficit Disorder group 8.94, Non-Attention Deficit Disorder group 11.12).

Figure 2. Gain in Mean Scores for Concept Clarification by Group



It was found that the ratio of gain for the Attention Deficit Disorder group was 1:6.62 while the ratio of gain for the Non-Attention Deficit Disorder group was 1:5.40, showing that the Attention Deficit Disorder group had a higher ratio of gain on Concept Clarification.

Hypothesis #6

There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Decision Making than for Non-Attention Deficit Disorder children.

For the skill of Systematic Decision Making the results of the paired t-tests on the Attention Deficit Disorder group are presented in Table 15. The results reveal that there is a significant mean difference between the pretests and posttests in Systematic Decision Making ($p. < .001$). The mean score on the pretests was 5.29 while the mean score on the posttests was 34.47, a difference of 29.18.

The paired t-tests results for the Non-Attention Deficit Disorder group on Systematic Decision Making are given in Table 16.

Table 15: Means, Standard Deviations, and t-Values for
 Pretests and Posttests in Systematic
 Decision Making for the Attention Deficit
 Disorder Group

Test	M	SD	t	p
Pretest Decision Making	5.29	2.80	-13.95	.001
Posttest Decision Making	34.47	10.01		

Table 16: Means, Standard Deviations, and t-Values for
 Pretests and Posttests in Systematic
 Decision Making for the Non-Attention
 Deficit Disorder Group

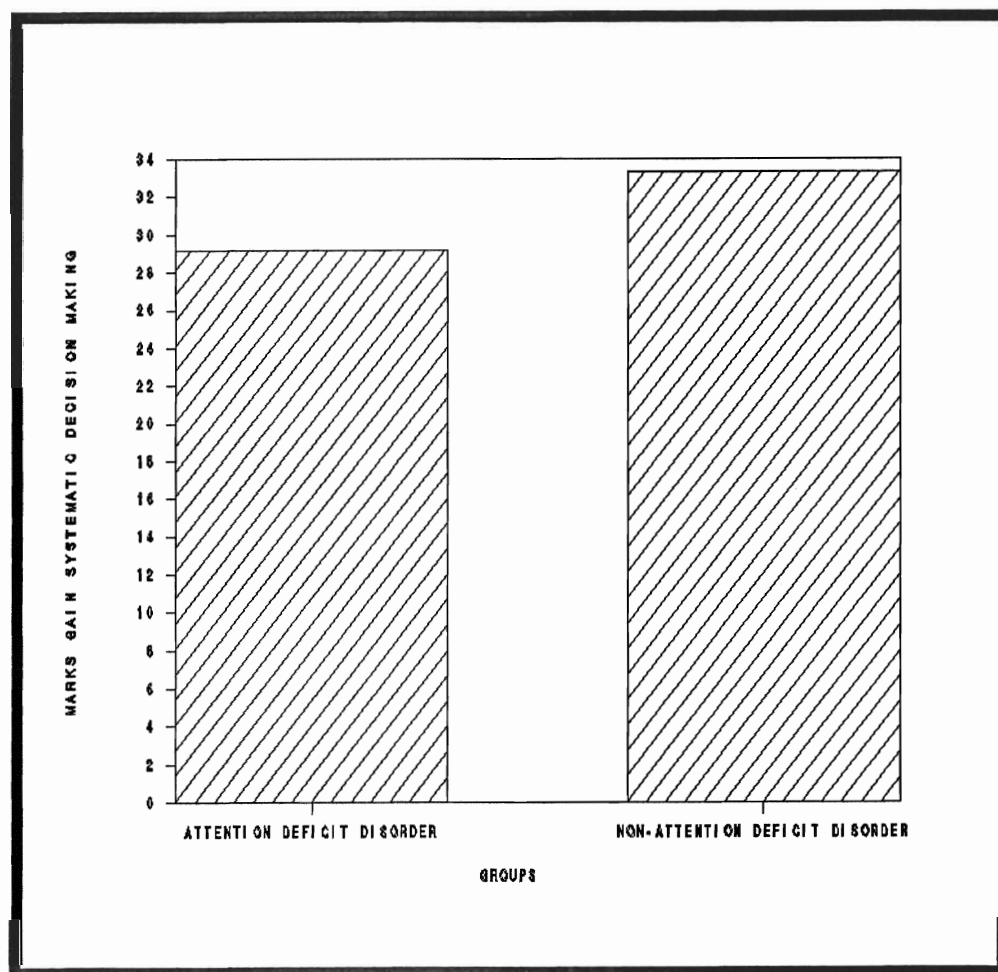
Test	M	SD	t	p
Pretest Decision Making	10.94	5.48	-21.85	.001
Posttest Decision Making	44.29	6.35		

There is a significant mean difference between the pretests and posttests in Systematic Decision Making ($p. < .001$). The mean score on the pretests was 10.94 whereas the mean score on the posttests was 44.29, a difference of 33.35.

The gain in mean scores for both the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group was significant. When comparing the gain of the Attention Deficit Disorder group (29.18) and the gain of the Non-Attention Deficit Disorder group (33.35), the difference is calculated. The difference is 4.17 in favour of the Non-Attention Deficit Disorder group (See Figure 3).

It is also interesting to look at the ratio of gain in scores for both the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group for the pretests and posttests of Systematic Decision Making. The ratio of gain is found by reducing to lowest terms the fraction created by placing the pretest mean score (Attention Deficit Disorder group 5.29, Non-Attention Deficit Disorder group 10.94) over the posttest mean score (Attention deficit Disorder group 34.47, Non-Attention Deficit Disorder group 44.29).

Figure 3. Gain in Mean Scores for Systematic Decision Making by Group



It was found that the ratio of gain for the Attention Deficit Disorder group was 1:6.5 while the ratio of gain for the Non-Attention Deficit Disorder group was 1:4.05. The Attention Deficit Disorder group had a higher ratio of gain than the Non-Attention Deficit Disorder group on Systematic Decision Making.

Correlations

For exploratory purposes, the relationship among the various subtests was examined. The results of the Pearson's Product Moment Correlation are given in Table 17. The correlations ranged from .21 to .63. Correlations at the .40 and above level were significant at the .05 level. The correlations were not surprising, in general, since the pretest and posttest were the same. Where the correlations are not significant, it is clear that the subtests are unrelated.

Restatement of Hypotheses

H-1. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Comparison. **CONFIRMED**

Table 17: Intercorrelations of all of the Subtests

	PREDM	POSDM	PRECC	POSCC	PRECOMP	POSCOMP
PREDM	1.00	.60**	.21	.56**	.53**	.50*
POSDM		1.00	.23	.44*	.55**	.56**
PRECC			1.00	.25	.26	.44*
POSDCC				1.00	.40*	.63**
PRECOMP					1.00	.54**
POSCOMP						1.00

(PREDM = Pretest Decision Making) (POSDM = Posttest Decision Making)
 (PRECC = Pretest Concept Clarification) (POSCC = Posttest Concept
 Clarification) (PRECOMP = Pretest Comparison) (POSCOMP = Posttest
 Comparison)

1 - tailed Significances * < .01
 ** < .001

H-2. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Concept Clarification. CONFIRMED

H-3. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Decision Making. CONFIRMED

H-4. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Comparison than for Non-Attention Deficit Disorder children. CONFIRMED

H-5. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Concept Clarification than for Non-Attention Deficit Disorder children. CONFIRMED

H-6. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Decision Making than for Non-Attention Deficit Disorder children. CONFIRMED

Summary

The six hypotheses were tested using the Statistical Package for the Social Sciences (SPSSPC). The analyses included descriptive frequencies, t-tests both paired and independent, and correlations. The six hypotheses were confirmed.

Expected results occurred from all of the tests for hypotheses 1,2,3,4,5, and 6. The Non-Attention Deficit Disorder children functioned significantly higher on the three pretests for Systematic Comparison, Concept Clarification, and Systematic Decision Making. Some interesting results occurred when comparing the gain of the posttests over the pretests between the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group. Although the gain was higher for the Non-Attention Deficit Disorder group, it was not a great deal higher. It was particularly interesting and meaningful when the ratio of gain for each group was compared. The ratio of gain for the Attention Deficit Disorder group was decidedly higher than the Non-Attention Deficit Disorder group.

CHAPTER FIVE

Introduction

In Chapter Five a brief summary of the rationale, literature review, methodology, and findings will be given. A discussion of the results will also be presented and will be followed by a presentation of implications, conclusions, and some recommendations.

Summary

In 1990, educators are still searching for ways to facilitate the learning of all children but especially those children who have special needs. The classroom teacher has been given more responsibility for the planning and implementation of program to meet the needs of children such as those who are characterized by Attention Deficit Disorder. Since Attention Deficit Disorder children are characterized by being inattentive, impulsive, and sometimes hyperactive, educators need to be aware of these characteristics when planning and implementing program. The Interdisciplinary Skills Program which has been based on schema theory should

improve attending behaviours because it creates a specific focus for the learner by building structural, procedural, and conditional schemata. Since schema theory enables attention that is specific and localized, learning should be increased because of the awareness of the elements within the focus. Therefore, the purpose of this piece of research was to see if educators could address some of the characteristics of Attention Deficit Disorder children and facilitate their learning through direct instruction intended to develop schemata. The hypotheses were set up so that a comparison could be made of the level of performance between Attention Deficit Disorder children and children without Attention Deficit Disorder on the pretests of Systematic Comparison, Concept Clarification, and Systematic Decision Making. A look at the ratio of gain between the pretests and the posttests for these two groups was also investigated to determine which group had the higher ratio of gain.

A review of current literature resulted in a number of interesting findings. It was discovered that Attention Deficit Disorder affected approximately six percent of school age children and many more boys were affected than girls. The possible causes of Attention

Deficit Disorder were seen as many and varied and no one possible cause seemed to be more predominant than any other. [Treatments for Attention Deficit Disorder range from biofeedback, fluorescent lighting, special diets, behaviour modification, structured environments, to drug therapy. Some of these have been found to be more effective than others but not one has been acclaimed as a definite cure. Because of the many problems that Attention Deficit Disorder children have, even into adulthood, a need has been demonstrated for programs which will help learners overcome the problems manifested by Attention Deficit Disorder. In the past, some degree of success has been had through information-processing programs. Since schema theory can be a basis for information-processing programs, perhaps it can play an important role in increasing the learning of Attention Deficit Disorder children.]

A sample of 34 Grade Seven students in Lincoln County were chosen for this study. Seventeen of these students had been identified as having the characteristics of Attention Deficit Disorder through the use of an established rating scale. Observations by the researcher and the homeroom teacher were also taken into

consideration. Samples of pretests and posttests for Systematic Comparison, Concept Clarification, and Systematic Decision Making were collected and analyzed.

The findings from this study demonstrated that there was a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretests of Systematic Comparison, Concept Clarification, and Systematic Decision Making. It was also shown that the ratio of gain between the pretests and posttests for Systematic Comparison, Concept Clarification, and Systematic Decision Making was significantly higher for children characterized by Attention Deficit Disorder than for children without Attention Deficit Disorder.

Discussion

The results as indicated in Chapter IV have significant ramifications for learners and especially learners characterized by Attention Deficit Disorder. Significant differences between Attention Deficit Disorder children and Non-Attention Deficit Disorder

children were found on the three pretests of Systematic Comparison, Concept Clarification, and Systematic Decision Making. In fact, the Non-Attention Deficit Disorder children scored significantly higher on all three tests which means that the Attention Deficit Disorder children had not achieved a level of performance equal to or greater than Non-Attention Deficit Disorder children before the pretests. This was to be expected since, historically, children characterized by inattentiveness and impulsivity have been underachievers. The results of the posttests also indicated that Non-Attention Deficit Disorder children scored significantly higher on the posttests than Attention Deficit Disorder children. However, when one looks at the gain achieved by both groups, the amount of gain difference is not large. The Non-Attention Deficit Disorder group achieved the larger gain but it was only slightly higher than the Non-Attention Deficit Disorder group. It is also interesting and particularly encouraging when the ratio of gain is investigated. For all three complex skills the ratio of gain for the Attention Deficit Disorder group was significantly higher than for the Non-Attention Deficit Disorder group. In this information- processing

program which is based on schema theory some of the characteristics of Attention Deficit Disorder children, inattentiveness and impulsivity, are addressed. Schema theory creates a specific focus for learners by building structural, procedural, and conditional schemata. It enables attention that is specific and localized. Therefore, there is learning because of the awareness of the elements within the focus.

Implications

There are a number of courses of action that are suggested by the findings in this research paper.

Recently, curriculum design experts have made a concerted effort to move away from knowledges as core content towards skills as the core content in conjunction with knowledges and affect. According to the results of this paper which used information-processing skills based on schema theory this move is supported, at least for the population sampled. In fact, if we want to increase the learning of Attention Deficit Disorder children this type of program is would be a worthwhile vehicle.

This study has shown that all the students involved

in this program benefited. The Non-Attention Deficit Disorder children and the Attention Deficit Disorder children both made significant gains in learning. This program, which emphasized the interrelatedness of schemata, made use of strategies which activated students' existing schemata, built on the activated schemata, and which taught the use of externalized representations that precedes internalized representations, demonstrated that both groups can learn in this manner. Therefore, the same methodologies and learnings can be used for both groups.

The classes that received instruction in the Interdisciplinary Skills were heterogeneous in composition. The educational system has been struggling for decades with a way in which to most effectively assist learners experiencing difficulties to increase their learning. Currently we are hearing some new terms such as restructuring and destreaming which include reference to the idea of eliminating classes for special learning problems and placing these learners back into heterogeneous classes. The findings of this research suggest that there is a possibility that this could be

done with Attention Deficit Disorder children and still have significant gains in learning if they are taught information-processing skills based on schema theory.

The students involved in this program were in Grade Seven. It has been demonstrated that this material can be learned and learned well at this age. The question that is called to mind is: Could this material have been learned at an earlier age?

Conclusions

/ We should not expect that the Interdisciplinary Skills Program will be a panacea for all the problems of Attention Deficit Disorder children. However, it has been demonstrated that learners who are inattentive and impulsive can learn at a rate almost equal to children who are not characterized by inattentiveness and impulsivity. It has been shown that the same methodologies and learnings can be taught effectively to Attention Deficit Disorder children and Non-Attention Deficit Disorder children. Therefore, both groups would benefit by being taught these skills using the same methodologies and learnings. / Since this material was

learned easily, perhaps educators should investigate at what age these skills can first be taught. It might be earlier than the Grade Seven level. The treatment took place in heterogeneous classes, so perhaps educators should look carefully at the make-up of classes when considering placement of children characterized by Attention Deficit Disorder. If Attention Deficit Disorder children can learn at a rate almost equal to Non-Attention Deficit Disorder children in a heterogeneous class, then perhaps educators should carefully consider class placement of children characterized by Attention Deficit Disorder. Should those who are placed in special classes remain there or would they benefit more in a heterogenous setting?

Recommendations

From the findings in this research the following recommendations are being made:

1. Examine the level at which the Interdisciplinary Skills could best be taught. Data for this study were collected from the Grade Seven level. Perhaps younger-aged children could have learned these skills as easily or almost as easily as the Grade Sevens. The Interdisciplinary Skills Program provides for growth in schemata development. It would be worthwhile examining the age of the learner in relation to growth within this program.
2. Examine the learning differences between male and female Attention Deficit Disorder children. It has been noted in the literature review that there are significantly higher numbers of boys who are characterized by Attention Deficit Disorder than girls. It has also been found that the boys' Attention Deficit Disorder characteristics are more severe. It makes one wonder if there are specific learning differences in gender to which educators should attend.
3. Investigate the differences in the level of

frustration for Attention Deficit Disorder children taught the Interdisciplinary Skills. Attention Deficit Disorder children become very frustrated children. They not only become frustrated with the demands made of them in their environment but also with themselves. These children recognize that they are different from Non-Attention Deficit Disorder children but find that they can do very little to eliminate these differences. If these children are taught the skills with which to manipulate information, will it help lessen their frustrations?

4. Examine if children, and particularly Attention Deficit Disorder children, can generalize the Interdisciplinary Skills. Children taught the Interdisciplinary Skills in this program were taught, for the most part, in isolated contexts. If these skills are going to be useful to the learner, he/she must be able to use them when necessary. This means that the learner should be able to generalize the skills to any context when the need arises. It would be interesting to investigate whether or not children can generalize these skills.

5. Investigate professional development for educators

teaching Interdisciplinary Skills. Currently, a coaching program is being implemented in Lincoln County for teachers at the Grade Seven and Eight levels. Workshops are also being given to help supplement this coaching. It would be interesting to find out how much coaching is necessary and the kind of coaching best suited for teacher growth.

6. Replicate this research with a larger/different population. To assist in establishing the validity of this piece of research, another study using a larger population or even a different age population would be advisable.

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APPENDIX A

TEACHER DISCUSSION QUESTIONS

1. Describe the student's organization in a) their desks, b) their notebooks.
2. What is their problem solving in math like?
3. Do they have friends? close? a lot?
4. Does this student have problems in following rules? How are these problems, if any, manifested?
5. What is this student's reaction to discipline?
6. Does this student behave in age appropriate manners?
7. Does this student work well in groups?
8. Does this student seek attention? How?
9. Has he/she to your knowledge been identified as learning disordered in any manner?
10. Is he/she involved in any special programming?
11. Is he/she on any special medication?

APPENDIX B

Pretests and Posttests

Lesson Sequence for Grade Seven In-Service
in Complex Thinking Skills 1988-1989

LESSON SEQUENCE FOR
GRADE SEVEN IN-SERVICE IN
COMPLEX THINKING SKILLS
1988-1989

For additional copies contact:
Curriculum Resource Office
Merritton High School
684-3623

RATIONALE

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The Ministry of Education expressed a clear statement of direction in Issues and Directions (1980) which provides the rationale for this in-service program.

"... The concept of the learner as a mere processor of information has been replaced by the image of a self-motivated, self-directed problem solver aware of both processes and uses of learning and deriving a sense of self-worth and confidence from a variety of accomplishments. This learner is guided by values consistent with personal religious-ethical beliefs, cultural traditions, and the common welfare of society..."

Objectives to address this image are included in many guidelines released by the Ministry over the last few years. Many of these objectives (particularly problem solving skills) are common across subjects such as Science, Language Arts, and specifically addressed in intermediate guidelines of History and Geography. Since many teachers teach more than one of these subjects, it seems logical to focus on the skills that are common across the disciplines when in-servicing teachers.

THEORETICAL BASIS FOR PROGRAM

Current theories about learning also form a basis for this in-service. Instructional methods associated with such theories have been developed and have proven effective in enhancing student performance.

Over the past few years, research has shown the value of teaching students how to construct visual representations and how to use them in solving problems. These representations are referred to as "organizers" or "frameworks".

The use of such organizers has many advantages:

1. An organizer facilitates instruction and assessment. (Both the teacher and the student can "see" the content and relationship of the ideas the student has produced and develop them further after the student's mental representation of the problem is externalized.)
2. An organizer is built from knowledge but guides the processing of information.
3. The use of an organizer keeps students "on track" as they proceed with various steps of locating, recording, analyzing and communicating information.
4. Organizers facilitate the learning and recall of content.
5. The use of an organizer improves both the quantity and logical organization of students' writing.

SKILL DEVELOPMENT / SKILL TEACHING

Complex thinking skills include the skills of :

- a) concept clarification
- b) model building
- c) narration
- d) description
- e) map making
- f) comparison
- g) correlation
- h) causal analysis (controlled variable experiments)
- i) decision making

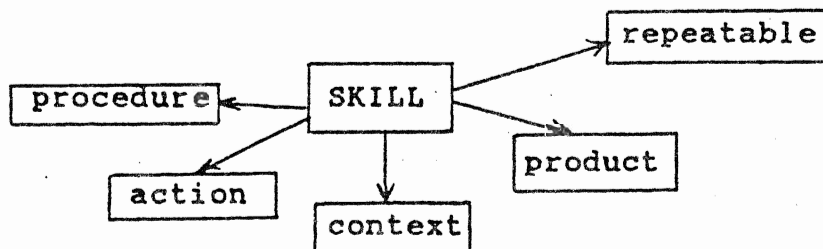
The skills that were demonstrated, practised and applied in your classroom were those of comparison, concept clarification and decision making.

For the purposes of this in-service program, a skill is defined as a repeatable mental or physical action with an identifiable procedure and a context that results in a product.

Skills, then, have five components:

- 1. repeatability
- 2. action
- 3. a procedure
- 4. a context
- 5. a product

The approach in this in-service program structures learning sequences so that students are exposed to a model that contains each component and then are provided with several opportunities to perfect each skill component.



Instructionally, you can vary five conditions to improve skill learning.

GROWTH SCHEME FOR EACH INSTRUCTIONAL COMPONENT OF A SKILL

repeatability

teacher helps during practice \longrightarrow help diminishes \longrightarrow independent practice

action

```

model  ----->  coach  ----->  provide oppor-
                                tunities for
                                reflection

```

procedure

tell \longrightarrow extract \longrightarrow develop their own procedures

context

familiar \longrightarrow unfamiliar

simple \longrightarrow complex

low stress \longrightarrow high stress

no emotion —————→ high emotion

product

simple \longrightarrow complex

short term → long term
(multiple skills)

clearly defined limits \longrightarrow student defined limits

COMPARISON

COMPARISON

LESSON # 1 PRE-TEST

Approximate time: 80 minutes

Objectives:

Students will complete the Comparison skill pre-test.

Strategies:

1. Explain to the students that this is a test that will not count towards their final mark but that it will help determine the amount of learning they have done. Students should be encouraged to do their best work on the test regardless of marks.
2. Distribute Form A to half of the class and Form B to the other half, or distribute Form A for the pre-test and Form B for the post-test.

NOTE: Keep records of the form number distributed to each student so that the alternate form can be given on the post-test.

COMPARISON

FORM A - COMPARISON

ANSWER THE FOLLOWING QUESTIONS ON THE SEPARATE PAPER PROVIDED

1. List the steps that you would use in making a comparison.
2. a) Examine the following sentences.
Write the words that relate the ideas in each sentence.
 - i) It was cool last week, whereas this week it is quite warm.
 - ii) Because I spent all my money, I am on a strict budget.
 - iii) I prefer mushrooms on my pizza, however, my friend likes hot peppers.
 - iv) As a result of hard work, I earned a high mark.
 - v) The volleyball team has new uniforms as well as new equipment.
- b) Supply the words that show the relationship between the two ideas in each sentence.
 - i) _____ the wind blows strongly, the flag flutters noisily.
 - ii) Ralph Lauren _____ Calvin Klein are popular fashion designers.
 - iii) My sister enjoys sports _____ I usually read in my spare time.
 - iv) High speed _____ more frequent car accidents.
 - v) _____ the boys play on a city team, they travel to many places.
3. Write an essay comparing three pets OR three hobbies OR three television shows OR three clothing styles.

FORM B - COMPARISON

ANSWER THE FOLLOWING QUESTIONS ON THE SEPARATE PAPER PROVIDED

1. List the steps that you would use in making a comparison.
2. a) Examine the following sentences.
Write the words that relate the ideas in each sentence.
 - i) That table is 2 metres long, whereas this table is 1 metre long.
 - ii) Because I ate a large lunch, I won't be hungry at supper.
 - iii) I prefer blue sweaters, however, my friend likes red ones.
 - iv) As a result of the accident, I limped all week.
 - v) The tennis player won the first set as well as the second set.
- b) Supply the words that show the relationship between the two ideas in each sentence.
 - i) _____ it has been very damp, the grass has grown quickly.
 - ii) Karen Kain _____ Veronica Tennent are famous Canadian ballerinas.
 - iii) My father likes shopping _____ I really don't enjoy it.
 - iv) Daily exercise _____ well-toned muscles.
 - v) _____ downtown streets are becoming more attractive, local people will shop there more frequently.
3. Write an essay comparing three pets OR three hobbies OR three television shows OR three clothing styles.

COMPARISON ANSWER KEY

Marks

- 6 1. List the steps that you would use in making a comparison.
1. Think of a topic
 2. Write the sub-topics
 3. Brainstorm to find criteria
 4. Fill the cells
 5. Identify relationships
 6. Number the cells
- 5 2. a) Examine the following sentences...
1. whereas
 2. because
 3. however
 4. as a result of
 5. as well as
- 5 b) supply the words. . .
1. whenever, because, as, while, when
 2. and, as well as, likewise, also, similarly
 3. however, although, while, but
 4. causes, results in, produces
 5. whenever, because, since.
- 27 3. a) Write an essay comparing 3 pets OR 3 hobbies
 OR 3 television shows OR 3 clothing styles.

					(1) Summary of relationships	
	O		2		3	
	S				4	
5	8		9		10	
					11	
						12
						13
6	14		15		16	
					17	
						18
						19
7	20		21		22	
					23	
						24
						25

Review - 26
React - 27

b) essay - 27 marks

LESSON # 2 BRAINSTORMING

Approximate time: 20 minutes

Objectives: Students will be able to brainstorm.
Students will be able to verbalize the procedure for brainstorming.

Strategies:

1. Tell students the procedure for brainstorming (Write it on chart or board).
 - a) Aim for fluency (a lot of ideas).
 - b) Piggy-back - add on to someone else's idea.
 - c) Welcome unique or outlandish ideas.
 - d) Accept all ideas.
 - e) Think of a number of different categories (flexibility).
2. Students should work in groups of 2 or 3. Limit the time to a maximum of 10 minutes.
3. Have students count up fluency scores (number of ideas).
4. Have students identify groups of related words or categories (flexibility score) e.g.

BIRDS:

Baltimore Orioles		Woody Woodpecker
sparrow	robin	hawk
Donald Duck		blue jay
finch	hummingbird	seagull
starling	grackle	crow
		snipe
owl	Big Bird	Toronto Blue Jays

Fluency score - total number of birds - 17

Flexibility score - cartoon characters - 3
baseball teams - 2
species of birds - 12

5. Recall the procedure for brainstorming.

Suggested ideas for practising brainstorming:

1. List the uses of peanut butter, jelly doughnuts etc.
2. List the uses of paper clips, shoes, doors.
3. List ways to get a hippo out of a bath tub.

This is a good exercise that can be done in 10 minutes per day.

LESSON # 3 DEMONSTRATION OF PLANNING A COMPARISON

Prerequisite: Students will have had several experiences with brainstorming.

Objectives: Students will be able to verbalize the procedure for planning a comparison.

Strategies:

1. Post the procedure for comparative writing. Tell the students that they will be giving ideas to co-operatively write an essay that compares and that this essay will be written on the blackboard.
2. Give students the topic of the essay (e.g. fast foods). Challenge students to identify three fast foods that can be compared. List these horizontally on the blackboard.

e.g.

FAST FOODS

hamburger	french fries	pizza
-----------	--------------	-------

3. Have students refer to the procedure chart and identify the third step of the procedure. (brainstorm)
4. Have the students brainstorm all of the words they can think of related to fast foods. List these words on the board. Continue brainstorming for approximately ten minutes.
NOTE: Guide students to include words in their brainstorming that will result in a variety of potential criteria. Do this by suggesting words from another category when students seem stuck with one train of thought.
5. Have students refer to parts b) and c) of the comparison step # 3 to organize the brainstormed words into similar categories. Model the isolation and identification of words that are similar from the brainstorm list by circling them. Have students tell how isolated (e.g. circled) words are the same. Repeat the modelling behaviour to generate at least three criteria. Put each criterion on the chart as it is identified.

COMPARISON

e.g.	FAST FOODS		
	hamburger	french fries	pizza
garnishes			
restaurants			
cooking method			

6. Once students have placed the topics and sub-topics and criteria on the developing chart, fill the cells of the chart with ideas found in the brainstorming list and/or other ideas still in their heads.
7. Have the students number the cells of the chart to show the order in which the essay will be written. Explain that the numbering could be done either horizontally or vertically but for our purposes, it will be done horizontally.
NOTE: Horizontal numbering will be advantageous when students are taught to compare information.
8. Put students in groups of 4. Select a topic. They have to choose sub-topics and brainstorm ideas co-operatively (for a maximum of 10 minutes) to find criteria.
9. Complete the comparison chart by filling in the cells.
10. Number the cells.

LESSON # 4 DEMONSTRATION OF COMPARATIVE WRITING

Objectives: Students should be able to verbalize the procedure for writing a comparative essay.

Strategies:

1. Draw students' attention to the procedure for writing a comparative essay. By modelling, have students use the matrix to write a comparative essay. Students should dictate sentences that the teacher can write on the board.

	Soccer A
Equipment B	Soccer ball C

ABC soccer equipment includes a soccer ball
 ACB soccer uses a soccer ball as equipment
 BAC equipment used in soccer includes a soccer ball
 BCA equipment such as a soccer ball is used in soccer
 CAB a soccer ball is used in soccer as equipment
 CBA a soccer ball is used as equipment in soccer

It may be useful at this point to show students how to vary the structure of their sentences.

2. Have students recall the steps of the comparative writing procedure.
3. Have students work in pairs to orally quiz each other on the steps of the procedure (e.g. list the procedure leaving one or more steps out or list procedural steps out of order)
4. Complete the opening paragraph and paragraph one of the body. When students are comfortable with the procedure, have them verbalize the remaining paragraphs. Have students write the final paragraph of the body and encourage them to read their paragraphs aloud. After this has been completed, model the concluding paragraph. It should include both a review and a reaction statement.

LESSON # 5 **GUIDED PRACTICE OF PLANNING AND WRITING A COMPARISON**

Objectives: Students will be able to write a comparison using the planning and writing procedures.

Strategies:

Review the planning procedure through oral questioning or scramble the steps of the process on a worksheet.

Students may wish to use the organizer they developed in lesson three or another topic of interest such as "My Favourite People". Ask them to follow the procedure to write a report (essay). Since this is a new skill, have them write an essay in groups, in which each student is responsible for one paragraph.

NOTE:

Students may need further guidance in the generation of criteria (i.e. vocabulary). For example: you may wish to model the procedure on the board with your "fictional" favourite people and have the students, as a group, come up with words such as "description", "personality", "relationship", "favourite foods", "career", which students can then use in their plans.

Review the marking scheme for students so they can analyze their essays for all the components before presenting them.

Students will present their group essay orally to the class and teacher for procedural evaluation.

LESSON # 6 ANALYSIS OF A COMPARATIVE ESSAY

Approximate time: 40 minutes

Objectives: Students will be able to analyze a comparative essay.

Strategies:

1. Recall the procedure for a comparison.
2. Hand out copies of the essay "A Sports Fanatic".
3. Explain that students will analyze the essay. Elicit from the students the meaning of the instructions. (Analyze means "take it apart and put the information on a chart".
4. Have students read the essay. Guide the analysis by starting the chart on the blackboard. Have students determine the topic, the number of sub-topics, the criteria and place this on the chart.

EXAMPLE:

	O	baseball	swimming	football
skills	S			
equipment				
object of game				

5. Have students work in pairs to complete the analysis (10 minutes). Have individuals do to board to fill in chart there.
6. Have students determine the mark out of 21.

Analyze the following comparative essay by recording the ideas in the essay on a chart to show their organization.

I really enjoy being involved in sports but my favourite three sports include baseball, swimming and football. I recognize that each of these sports requires different skills and equipment and that the object of each sport is also different.

Baseball, swimming and football are sports that help to keep me in shape because each one lets me sharpen different physical skills. In baseball my running, swinging and catching skills are practised. Arm control and breathing regulation are practised in swimming. When I'm involved in playing football, my fast reactions, darting and kicking abilities get an extra workout.

My parents have invested a fortune in the sports equipment I need to be active in baseball, swimming and football. When I play baseball, I dig out my spikes, my helmet, and the new leather glove I need for my first base position. Towels, eye goggles, a swim suit and sometimes flippers and a snorkel accompany me on swimming days. When I have an opportunity to play football, I dig the knee pads, shoulder pads, helmet, chest protector and another type of spikes out of the closet.

Each of these sports gives me an opportunity to be active but the object of each sport is different enough to give me the variety enjoy. In baseball, the object is to beat the returning ball as I race madly around the bases. Swimming is very different because here the object is to improve my racing time when I'm swimming lengths, or to improve the appearance of my non-timed skills such as diving or using different swim strokes. When I play football the object is to catch and hold a very slippery pigskin against incredible odds.

I love playing baseball and take every opportunity to do so. I feel much the same about swimming and football. The physical benefits of these sports, their variety, and the investment that I've already made in each one will keep me interested for a long time to come.

LESSON #7 RELATIONAL WORDS AND PHRASES

Approximate time: 40 minutes

Objectives: Students will develop a list of 20 relational words and be able to use them in sentences to show similarities, differences and cause and effect relationships.

Strategies:

1. Clarify the term relationship (connection or link between objects or ideas).
2. Show students 3 objects of interest (i.e. skis, skates, books, skateboards, etc.)
3. Model a relational sentence, i.e. All of the skateboards have wheels.
4. Have students identify the relational word or phrase (all) in the sentence.
5. Determine the type of relationship that was identified by the relational word, i.e. similarities.
6. Have students verbalize more sentences which point out similarities using other words. List the relational words used on a chart.
8. Repeat the procedure for differences and cause and effect relationships.
9. Have students use relational words and phrases to write 3 sentences for each type of relationship - similarities, differences and cause and effect.

Words to Connect Ideas:Similarities

and
in addition to
likewise
neither . . . nor

too
include, including
similarly

also
as well
just as

Differences

whereas
in contrast
dissimilarly

although
however
while

but
unlike

Causal Relationships

as a result of
results in
produces

because
if . . . then
can be expected to

causes
whenever
since

LESSON #8 DEMONSTRATION OF RELATIONAL WORDS IN A COMPARISON

Approximate Time: 40 minutes

Objectives: Students will be able to find similarities, differences, and cause and effect relationships and express them in relational sentences.

Strategies:

1. Display comparison planning chart of three fast foods on overhead projector.
2. Point out that the last essay the students wrote followed the procedure for writing a comparison, however, it did not compare.
3. Review the meaning of the word "compare". Ideas such as "finding things that are the same or different" should come out. Display charts that show the relational words used for similarities and use other relational words to express them in sentences.
4. On the overhead transparency, model the procedure for finding similarities by looking across the cells for one criteria. Using a coloured marker, circle words or ideas that are similar. Say a sentence to express the similarity. Have students find other similarities and use other relational words to express them in sentences.
5. Repeat to find differences using a different coloured marker and boxing the words.
6. For cause and effect relationships, look vertically on the chart. Model the procedure as in Numbers 4 and 5.
7. Hand out worksheet to have students practice relationship sentences.

NOTE: It may be helpful to students to have additional exposure to words that are used to connect similarities, differences and cause/effect relationships. Classroom teachers can encourage the development of the ability to write relational statements using these connecting words by providing regular reminders and deliberate opportunities to practice the use of these words.

The teacher should post charts containing these relational words so that students can refer to them regularly.

COMPARING FAST FOODS

() Inclusive Relationships (Same)

Name: _____

() Exclusive Relationships (Different)

Class: _____

() Cause and Effect

School: _____

Date: _____

	HAMBURGER	FRENCH FRIES	PIZZA
Restaurants	McDonald's	McDonald's	Pizza Delight
	Wendy's	Wendy's	Heavy Duty Pizza
	Arby's	Arby's	
Garnishes	tomato	salt	sauce
	relish	vinegar	cheese
	mustard	ketchup	mushrooms
	onion		bacon
	lettuce		peppers
	pickle		anchovies
Cooking Method	ketchup		pineapple
	fry	deep fry	bake
	barbecue	broil	microwave
	flame broil		
	microwave		

SIMILARITIES (INCLUDING RELATIONSHIPS)

Name: _____ Class: _____ Date: _____

To make your writing more interesting, ideas can sometimes be connected using words that include both of the items being compared.

Some words or phrases that show including relationships are:

and	too
in addition	include, including
also	similarly
likewise	just as
as well	neither ... nor

In each of the following sentences, supply an appropriate word or phrase that indicates an including relationship.

1. The girls have a school basketball team _____ the boys do.
2. Brands of blue jeans that are very popular _____ Levi and Wrangler.
3. We had a project to do during the last term _____ we will have one to do next term.
4. The grade five students helped to plan their school trip _____ the grade four students did.
5. _____ to this assignment, complete the following page.
6. _____ both Superwoman and Spiderman are popular cartoon characters.
7. You should complete your dance routine _____ arrange for the music you need.
8. Our softball team won the championship last year. We hope to win again this year _____.

DIFFERENCES (EXCLUDING RELATIONSHIPS)

Name: _____ Class: _____ Date: _____

Ideas can be shown to be different by using words that exclude. Excluding words are ones that highlight differences between two ideas.

Some words or phrases that show excluding relationships include:

whereas.	although
but	however
in contrast	dissimilarly
unlike	while

In each of the following sentences, supply an appropriate word or phrase that indicates an excluding relationship. Where more than one answer is acceptable, give all possible answers.

1. Our school team wore blue and white uniforms _____ the opposing team wore red and yellow.
2. _____ I did poorly on my last science test, I plan to work hard and do well on the next one.
3. Quebec City has a wall around it _____ most urban areas to not.
4. I have saved forty dollars _____ I haven't yet saved enough.
5. Some sports require heavy equipment _____ others do not.
6. _____ last year's musical, this year's musical will be presented in early March.
7. Hot tea is frequently served without sugar _____ iced tea is not.
8. Cotton is a lightweight material that is cool to wear _____ wool is heavy and holds heat close to the body.

SIMILARITIES OR DIFFERENCES ?

Name: _____ Class: _____ Date: _____

For each of the following sentences, tell whether the relationship indicated in the sentence is an including or an excluding relationship by writing the word including or excluding on the line provided to the right side of each sentence.

<u>Sentence</u>	<u>Type of Relationship</u>
1. Although the boys are the same age, they are not the same height.	_____
2. Hair dyes can damage hair. Frequent blow drying can cause hair damage too.	_____
3. This is your final mark. It includes the results of all assignments and tests.	_____
4. TV comedy shows that are very popular include "The Cosby Show" and "Family Ties".	_____
5. There are five players on a basketball team. However, a hockey team has six players.	_____
6. Stamp collectors usually collect their treasures in a book but antique collectors need a room, or even a house for their collections.	_____
7. Whereas Irish Wolfhounds have long, slender legs, beagles' legs are short and stubby.	_____
8. Just as hockey players wear sweaters for warmth, football players wear sweaters, too.	_____

Name: _____ Class: _____ Date: _____

Writing can be made more interesting and more informative when ideas are connected by using words that indicate a causal relationship. Causal relationships exist when one thing is seen to cause another. One very simple example is shown below.

She hit the baseball too hard.
As a result, the neighbour's window was broken.

Some words or phrases that show a causal relationship include:

since	causes
as a result of	because
if ... then	produces
results in	whenever
can be expected to	

From each of the following sentences, circle the word or phrase that indicates a causal relationship.

1. Since traffic was so heavy, the cars were moving very slowly.
2. Fire can be expected to spread quickly with fuel and a supply of oxygen.
3. If you stub your toe then you will feel pain.
4. The chemical dioxin causes cancer cells in laboratory rats.
5. Whenever green leaves are boiled in alcohol, chlorophyll is removed.
6. The vampire returned to his coffin because the sun was rising.
7. I feel very full because I ate too much pizza.
8. The cost of borrowing money results in lower consumer spending.

LESSON 19

GUIDED PRACTICE OF COMPARISON WITH RELATIONAL SENTENCES

Objective: Students will be able to plan and write a comparative essay with relational sentences.

Strategies:

1. Using the matrix developed in lesson 8, students should write their essays (reports).
2. It may be necessary to model the essay verbally and/or in written form before the students begin to write independently.
3. When the essays are complete, have students work in pairs to evaluate the procedure. Students should draw a framework and fill it in using the essay.
4. Mark essays to hand out next class.

LESSON #10

40 minutes.

Objectives:

Strategies:

1. Recall the procedure for a comparison.
2. Hand out copies of the essay "SPORTS".
3. Explain that students will analyze the essay. Elicit from the students the meaning of the instructions. ("Analyze" means "to take it apart and put the information on a chart").
4. Have students read the essay. Guide the analysis by starting the chart on the blackboard. Have students determine the topic, the number of sub-topics, the criteria and place this on a chart.
5. Have the students work in pairs to complete the analysis. (10 to 15 minutes) Have individuals go to the board to fill in the chart there.
- 3
6. Have students determine the mark out of 27.

(1) Topic

O				Summary Column			
S	2	3	4				
5	8	9	10	11	12		13
6	14	15	16	17	18		19
7	20	21	22	23	24		25

Review	26
React	27

SPORTS

I enjoy sports. Baseball, hockey and soccer are my favourites. I enjoy the actions, equipment and people involved in these three sports.

The actions in hockey, soccer and baseball are similar in many ways. Soccer and baseball have running while hockey requires skating. Hockey and soccer have passing just as baseball has throwing. They are similar because they are actions used to move an object to another person on your team. Other important actions in soccer are kicking, blocking and shooting. Shooting and blocking are also important in hockey but not in baseball where hitting, catching and tagging are useful actions.

Equipment is required to play these three sports. Soccer and baseball have a ball while a puck is used in hockey. The objects are similar because they are moved by the players. However, in baseball and hockey the object is moved using a stick or bat while in soccer only the feet or hands are used. Because the object is struck using a stick or bat in hockey and baseball, the players wear protective equipment such as helmets to protect the head from injury. Other equipment needed for soccer is a net, shinpads and spikes. Hockey also requires a net as well as skates and pads for protection. Baseball players use gloves and spikes as well.

Many people are involved when these sports are played. Hockey and soccer have a referee while baseball has an umpire. Referees and umpires are similar because they keep the games under control and make judgements about the rules. Soccer, hockey and baseball all have players. The number of players in each sport is different but they all provide exciting action for spectators to watch.

I enjoy all three sports because of the variety of equipment, actions and people involved. Baseball, hockey or soccer are excellent sports to play.

LESSON #11 APPLICATION OF COMPARATIVE ESSAY TO A SUBJECT AREA

Objectives: Students will be able to transfer the procedure of planning and writing a comparison to a subject area.

Strategies:

The teacher must determine within which subject area the skill of comparison will fit. It can apply to many subjects.

e.g. Novel Study

- compare two novels
- compare three characters from a story

History

- compare Upper Canada to Lower Canada
- compare family life then and now

Geography

- compare climatic regions
- compare physical regions

Science

- compare three insects (or small creatures)
- compare CO₂ with O₂
- compare a pond community with a field community.

LESSON #12 POST TEST

Objectives: The students will be able to write a comparative essay to compare three sub-topics and demonstrate their understanding of relational sentences.

Strategies:

Refer back to the process you used in the pre-test.

NOTE: Students will need regular practice in each of the sub-skills involved in writing an effective comparative essay. This lesson sequence outlines only the major stages in promoting growth in the skill. Classroom teachers should plan to include several contextual practice opportunities following each lesson.

CONCEPT CLARIFICATION

CONCEPT CLARIFICATION

LESSON #1 PRE-TEST

Approximate Time: will vary

Objectives: Students will complete the skills pre-test

Strategies:

1. Explain to the students that this is a test that will not count towards their final mark but that it will help determine the amount of learning they have done. Students should be encouraged to do their best work on the test regardless of marks.
2. Distribute Form A to half of the class and Form B to the other half, or distribute Form A as the pre-test and Form B as the post-test.

NOTE: Keep records of the form number distributed to each student so that the alternate form can be given on the post-test.

CONCEPT CLARIFICATION

FORM A - CONCEPT CLARIFICATION

ANSWER THE FOLLOWING QUESTIONS ON THE SEPARATE PAPER PROVIDED

1. List the steps you would use to clarify a concept.
2. Write a definition for the concept "government".
3. Below is a definition for a concept. Give the concept name.

"a large object with a motor; used to keep food cool"

4. Below is a definition that could identify the concepts horse or lion. Add one critical characteristic to the definition so that the final definition is one that identifies only horse.

horse/lion - a large, four-legged animal with a mane and a long tail

5. Draw a concept diagram to identify the critical characteristics of the concept watch as defined below:

watch - a mechanical device worn on the body to measure time

CONCEPT CLARIFICATION

FORM A - CONCEPT CLARIFICATIONANSWER KEY

1.
 - a) name the concept
 - b) use the concept name in a sentence
 - c) write a definition of the concept
 - d) test the definition using examples and non-examples of the concept
 - e) adjust the definition
 - f) when the definition is stable, defend the definition using an example of the concept
 - g) box the critical characteristics
 - h) make a concept diagram

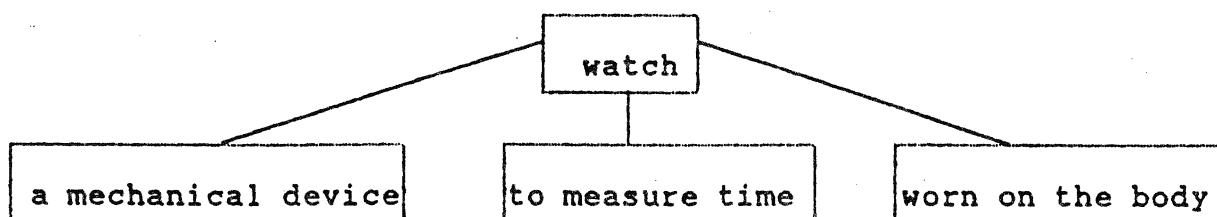
or) see the procedure in the manual

2. Government
 - group of people
 - with power and authority
 - to make decisions and laws
 - for a certain area

3. Refrigerator

4. Horse
 - has hoofed feet
 - neighs
 - eats oats or grass

5.



CONCEPT CLARIFICATION

FORM B - CONCEPT CLARIFICATION

ANSWER THE FOLLOWING QUESTIONS ON THE SEPARATE PAPER PROVIDED

1. List the steps you would use to clarify a concept.
2. Write a definition for the concept "law".
3. Below is a definition for a concept. Give the concept name.
"an electronic device that processes
information and performs calculations"
4. Below is a definition that could identify the concepts car or plane. Add one critical characteristic to the definition so that the final definition is one that identifies only plane.
car/plane - motorized vehicle used to carry people and things
5. Draw a concept diagram to identify the critical characteristics of the concept book as defined below:
book - pages bound together to relate information

CONCEPT CLARIFICATION

FORM B - CONCEPT CLARIFICATIONANSWER KEY

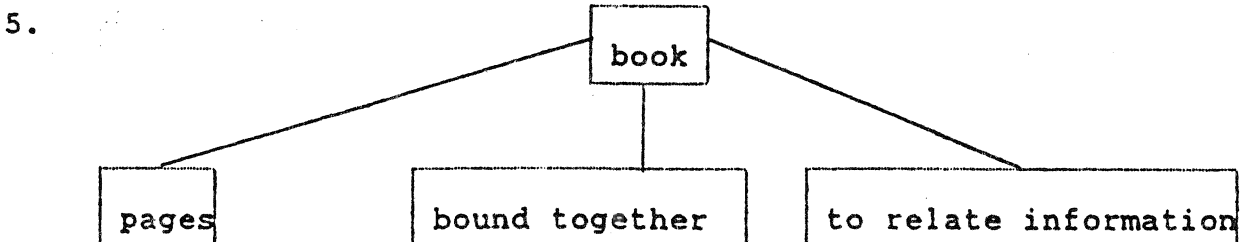
1.
 - a) name the concept
 - b) use the concept name in a sentence
 - c) write a definition of the concept
 - d) test the definition using examples and non-examples of the concept
 - e) adjust the definition
 - f) when the definition is stable, defend the definition using an example of the concept
 - g) box the critical characteristics
 - h) make a concept diagram

or) see the procedure in the manual

2. Law
 - rules or regulations
 - made by people with authority
 - to be obeyed by people
 - with penalties for disobedience

3. computer

4. Plane
 - has wings
 - flies



CONCEPT CLARIFICATION

LESSON #2 CONCEPT CLARIFICATION

Approximate time: 40 minutes

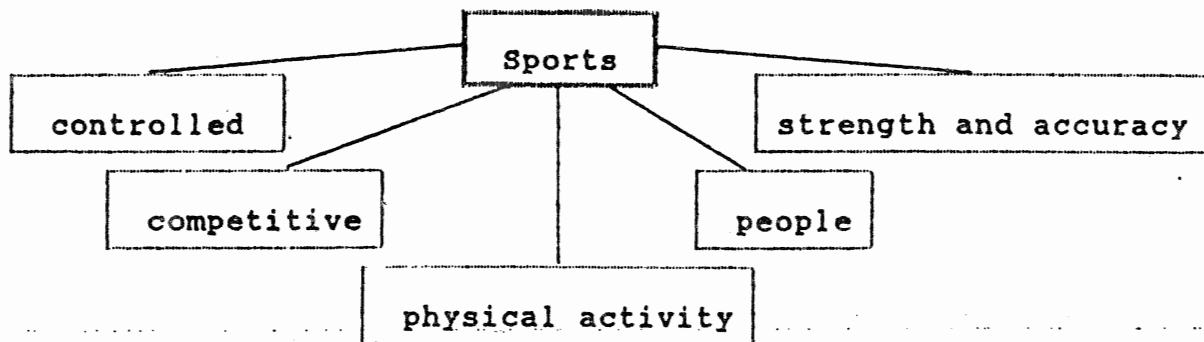
Objectives: Students should be able to express and use the procedure for clarifying a concept, using concrete nouns.

Strategies:

1. Discuss the idea that words (nouns) are names we give to concepts.
2. Take the students on a "mental walk" by having students mentally visualize things as the teacher states certain nouns (e.g. car, tree, refrigerator, money, daffodil, family)
3. Tell students that concepts are names we give to mental images. It is helpful to make these images clearer by writing them down through a procedure. Display a concept clarification procedure on chart paper.
4. Write a familiar concept on the blackboard (e.g. sports, table).
5. Ask the students to use the concept name in a sentence. (If the students are unable to do this, provide many more experiences with concepts such as sports or table.)
6. Ask the students for a definition of the concept "sports" (e.g. "Sports are games that people play"). Write it on the board.
7. Match this definition to a non-example, (e.g. is Monopoly a sport).
8. Adjust the definition. Match it then to an example of a sport (e.g. baseball).
9. Continue to do this until a stable definition is reached, (e.g. "Sports is a controlled, competitive physical activity of people which involves a combination of strength and accuracy).
10. Suggest non-examples of the concept and how each non-example is lacking in some aspect of defined concept. Suggest new examples of the concept and show how each example fulfils the characteristics of the definition.

CONCEPT CLARIFICATION

11. Develop a diagram of the concept to show each of the characteristics identified in the definition, e.g..



12. In partners, have the students clarify a concrete concept, (e.g. car, tree, frog, horse).
13. Students will present their diagrams for evaluation.

CONCEPT CLARIFICATION

LESSON #4 CONCEPT CLARIFICATION ANALYSIS

Approximate time: 40 minutes

Objectives: Students will be able to analyze the critical characteristics of a concept.

Strategies:

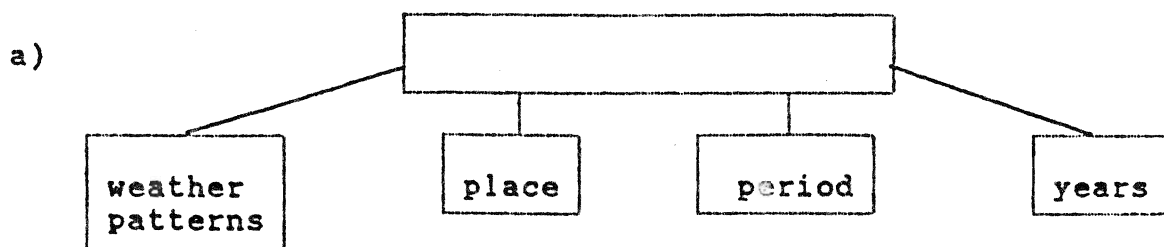
1. Recall the procedure for clarifying a concept.
2. Review critical characteristics of several concepts.
3. Hand out "Concept Clarification Analysis Worksheet" and have the students complete it in pairs.

CONCEPT CLARIFICATION

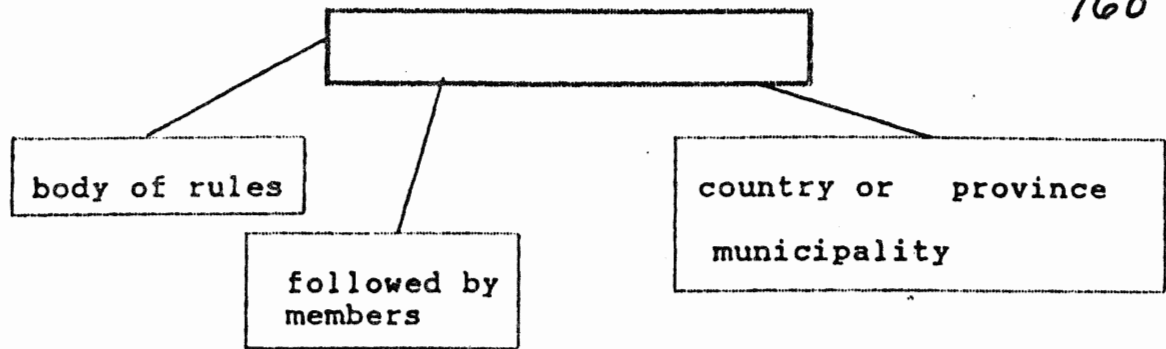
CONCEPT CLARIFICATION ANALYSIS

1. A concept is _____

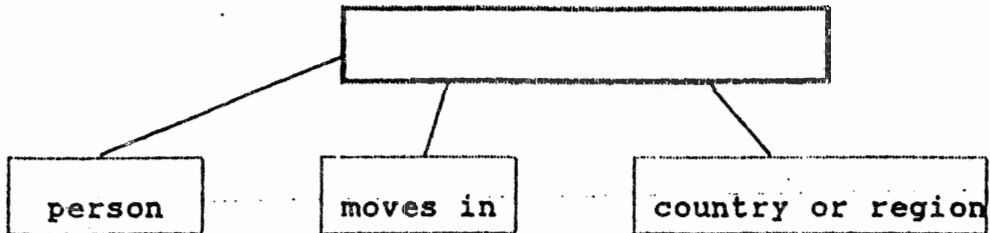
2. Below is a definition for a concept. Give the concept name.
 - a) "a four wheeled motorized vehicle used to carry things"
 - b) "an electronic device that receives signals as sound and pictures"
 - c) "a large object with a motor; used to keep food cool"
 - d) "a four-pawed mammal, with a mane and long tail"
3. Go back to question 2 and box in the critical characteristics.
4. Add one critical characteristic to make the definition stable:
 - a) love - "a feeling between 2 or more people"
 - b) clock - "a mechanical device"
 - c) book - "written information"
 - d) ruler - "a person who has authority and control"
5. Fill in the concept name:



b)



c)



6. Write a stable definition and draw a concept diagram for:
religion

CONCEPT CLARIFICATION

LESSON #5 APPLICATION OF CONCEPT CLARIFICATION TO SUBJECT AREA

Approximate time: will vary

OBJECTIVES: Students will be able to transfer the procedure of concept clarification to a subject area.

STRATEGIES:

The teacher must determine which subject area the skill will fit. It can apply to many subjects.

e.g.	Language Arts	-	a novel
		-	a character
	Math	-	a square
		-	a circle
		-	a sphere
	History	-	a settlement
		-	rebellion
		-	government
	Geography	-	a region
		-	climate
		-	flora
		-	fauna

Discuss with students the topic and sub-topics they may wish to use.

CONCEPT CLARIFICATION

LESSON # 6 POST TEST

Approximate time: will vary

OBJECTIVES: The students will be able to clarify and analyze concepts.

STRATEGIES:

Refer to the procedure you used in the pre-test (Lesson #1, page 32)

DECISION MAKING

LESSON #1 PRE-TEST

Approximate Time: 80 minutes

OBJECTIVES: Students will complete the decision making skills pre-test.

STRATEGIES:

1. Explain to the students that this is a test that will not count towards their final mark but it will help determine the amount of learning they have done. Students should be encouraged to do their best work on the test, regardless of marks.
2. Distribute Form A to half of the class and Form B to the other half or distribute Form A for the pre-test and Form B for the post-test.

NOTE: Keep records of the form number distributed to each student so that the alternate form can be given on the post-test.

FORM A - DECISION MAKING

ANSWER THE FOLLOWING QUESTIONS ON THE SEPARATE PAPER PROVIDED

1. List the steps you would use to make a decision.

2. Tomorrow is a school holiday. You consider spending the day watching videos, visiting friends or relatives, or shopping at the mall. List four criteria you will consider when deciding how to spend the day.

3. On the following page is an example of an argumentative essay. Read the essay and state:
 - a) the alternatives
 - b) the criteria
 - c) the decision made

4. Sarah has witnessed a classmate cheating on a test. If you were Sarah, decide what you would do about this.
 - a) Use a chart to show how you made your decision (include three alternatives and three criteria)
 - b) Write an essay to defend your decision.

WHICH HOBBY IS BEST ?

Since my parents feel that I have far too much spare time on my hands, I guess that it's time for me to choose a hobby. I enjoy collecting stamps, but I also enjoy collecting Beatles' albums. In considering the benefits of each of these hobbies, I have tried to determine which will cost me the least, which is likely to give me the most benefit from the time I have available for hobbies and which is likely to also be enjoyed by my closest friends.

I have chosen to collect a varied and valued number of Beatles' albums. Although albums are very expensive, the music on the Beatles' albums is unique and really enjoyable for leisure listening. Several of my friends also enjoy and collect Beatles' albums so that it would be possible to share each other's collections if I got involved in collecting too.

Stamps are a potentially lucrative hobby but I think I'll bypass this hobby until I'm ready to retire. Many stamps can be very costly. Although many people would probably call this an investment, I'm afraid that my budget would only allow for a very small collection. I know I would enjoy shopping for, and cataloguing the stamps but, with a small collection these activities wouldn't take much time and so would be of very little benefit as a hobby. None of my close friends collect stamps.

I am confident in my decision to make a hobby out of collecting Beatles' albums. The enjoyment I will get out of this is guaranteed and I can always sell my collection later if the idea of collecting stamps looks more interesting and I need a source of money to get started.

FORM B - DECISION MAKING

ANSWER THE FOLLOWING QUESTIONS ON THE SEPARATE PAPER PROVIDED

1. List the steps you would use to make a decision.
2. You only have enough extra time to join one school activity or team. You consider joining the drama club, playing basketball or joining the choir. List four criteria you will consider when deciding how to spend your extra time.
3. On the following page is an example of an argumentative essay. Read the essay and state:
 - a) the alternatives
 - b) the criteria
 - c) the decision made
4. Sam has received a failing grade on an important test. He has to have both of his parents sign the test, and return it to the teacher, but he knows that his parents will be very upset by the poor mark. If you were Sam, decide what you would do about this.
 - a) Use a chart to show how you made your decision (include three alternatives and three criteria)
 - b) Write an essay to defend your decision.

SMOKING IS A CLOUDY ISSUE

As I grow older and start to make my own decisions, I am constantly faced with the realization that I can smoke if I want to. To smoke or not to smoke is the question I have wrestled with. However, I have reached the point where I know definitely that I will go through life never knowing the taste of a cigarette. The pressure of advertising, concerns about my health and concerns about being accepted by my friends weighs heavily in my mind when the subject of smoking comes up.

I have chosen not to smoke ever in my life. Doctors warn that smoking causes heart and breathing problems and can lead to lung cancer. I want to lead a healthy life so I won't start. The idea of smoking is not as popular as it once was, so more of my friends are non-smokers than smokers. Actually, my social group prefers the trend of a smoke-free environment so I fit right in. I can see through the commercials that portray fun-loving people smoking. Smoking is not glamorous in my eyes.

I have decided that smoking is not the way to go. Although it may make some people feel important or "grown-up" or tough to smoke, that is not what I need in my life. There are some people who have lead a relatively healthy life even though they smoke but the health risk they take is too great for me to want to start smoking. There continues to be a great deal of social pressure on young people to experiment with smoking because other people are doing it. I think I am secure enough with myself without having to smoke.

My decision to be a non-smoker is the right one. By refraining from smoking, I will be a healthy person. I will also be one who is respected by others because of my choice not to smoke. The smokers in magazines no appeal for me. I am pleased that I have made the correct choice.

ANSWER KEYPRE- AND POST- TESTS

- (10) 1. Refer to the Procedure Handbook included at the end of this package.
- (4) 2. Any four criteria appropriate to the situation.
- (6) 3. FORM A - "Which Hobby is Best"
- i) collecting stamps
 - collecting Beatles' albums
 - ii) cost
 - benefit for the time available
 - which will my friends enjoy
 - iii) collecting Beatles' albums
- FORM B - "Smoking Is A Cloudy Issue"
- i) to smoke
 - not to smoke
 - ii) pressure of advertising
 - concerns about my health
 - acceptance by my friends
 - iii) not to smoke

- (22) 4. a) 1. Decisional Question

Options

	2	3	4	
Criteria and Weight	4,5	10	11	12
	6,7	13	14	15
	8,9	16	17	18
		19	20	21
Desirability Index (totals)				

- (10) b) Opening Paragraph
- sentence that tells the question (1)
 - options (3)
 - criteria (3)
 - weighting (3)
 - decision (1) (optional)

(12)

Body

- assume three paragraphs
- option (1)
- criteria (3)
- (4 marks X 3 paragraphs)

(2)

Closing

- Review (1)
- React (1)

LESSON #2

DEMONSTRATION OF THE DECISION MAKING PROCESS

Approximate time: 40 minutes

OBJECTIVES:

1. Students will be able to list the steps involved in the decision making process.
2. Students will be able to list five problems that might warrant the use of this process.

STRATEGIES:

1.
 - a) Discuss examples of types of decisions made by students. e.g. flipping a coin, tossing the bat, rock/paper/scissors, she loves me/she loves me not, one-potato/two-potato, eenie-meenie
 - b) Establish that these procedures are used to make decisions of little consequence.
 - c) Suggest that there is a procedure to assist in making major decisions such as career, university or making a large purchase.
 - d) Introduce the term "decision making" indicating that it is a procedure for dealing with complex problems.
2.
 - a) Explain the situation "We have won \$1,000 in a lottery"
 - b) Have the students state an open-ended decisional question. e.g. What shall we do with the \$1,000 ?
3. Have the students suggest some options. Choose four for demonstration purposes (e.g. Bank it, buy clothes, buy a stereo, party).

	<u>Options</u>			
	Bank	Clothes	Stereo	Party

4. a) Elicit from students a list of things they should consider: (criteria) on which they will base their decision.

Express criteria in question form: i.e.

What do I need ?

What do I want ?

Will my parents approve ?

Will I like it ?

Options

C
R
I
T
E
R
I
A

	Bank	Clothes	Stereo	Party
What do I need ?				
What do I want ?				
Will parents approve ?				
Will I like it ?				

- b) Consider the criteria and weight them.
Which is most important ?

e.g. Most important x 3

Equally important x 3

Less important x 2

Least important x 1

NOTE: weighting should reflect the relative importance of each criteria to your decision

Options

	Bank	Clothes	Stereo	Party
What do I need? x 2				
What do I want? x 1				
Will parents approve? x 3				
Will I like it? x 3				

- c) Rank order each option against each criterion and assign the number value in the top right corner of each cell.
e.g. When we consider these four options, which do we need the most ?

Choose one student to do each criterion.

Best 4
Next 3
Next 2
Least 1

C R I T E R I A	<u>Options</u>				
	Bank	Clothes	Stereo	Party	
	What do I need ?	1	3	4	2
	What do I want ?	2	3	1	4
	Will parents approve ?	2	4	1	3
	Will I like it ?	4	1	2	3

- d) Multiply this number by the weighted value of the criteria. Continue to do this for each criteria.

	<u>Options</u>							
	Bank		Clothes		Stereo		Party	
C	What do I need ?	(2) 1	(6) 3	(8) 4	(6) 2			
R	What do I want ?	(2) 2	(3) 3	(1) 1	(4) 4			
I	Will parents approve ?	(6) 2	(12) 4	(3) 1	(9) 3			
T	Will I like it ?	(12) 4	(3) 1	(6) 2	(9) 3			
E								
R								
I								
A								
	**D.I. (totals)	(22)	(24)	(18)	(26)			

5. a) Have student volunteers total the column for each option.
**Desirability Index

- b) Look at the highest number to answer the decisional question (highest total). "We have decided to have a party." If there is a tie or two extremely close numbers, ask for methods to break the tie.
e.g.

"identify more criteria or go through the procedure again or divide the money between the two options."

6. a) Recall the procedure with the students and record the steps on the blackboard.
b) Have the students copy the procedure in their notes for future reference.
7. Have the students list five problems that might warrant the use of this process.

LESSON #3

GUIDED PRACTICE OF DECISION MAKING

Approximate time: 40 minutes

OBJECTIVES: Students will be able to make a rational decision using the decision making procedure modelled in lesson #2.

STRATEGIES:

1. Review the planning procedure through oral questioning or scramble the steps of the process on a worksheet.
2. Hand out copies of "The Doko" or any other story of interest. Together, read the story, clarify the situation and have the students formulate the decisional question (How till the boy stop his father?).
Note: Role playing can be used in clarifying the story.
3. Ask students to follow the modelled decision making procedure to formulate a rational decision. It is best if students work in groups or pairs to accomplish this task.
Note: Students may require further guidance in the generation of criteria and the modelling of the procedure.
4. Have the decision presented and defended by the criteria developed.

THE DOKO

In a small village in Nepal lived a man and his wife and their small boy. They were very poor and often they didn't have enough to eat. Moreover, the man's father lived with them. He had worked hard all his life, but now he was too old to work any more and he had no one else to look after him.

The old man needed a lot of looking after. His son and his daughter-in-law grumbled at him and neglected him, so the old man was thin and dirty. His clothes were worn out and he shivered all night on his mat in the corner where he tried to sleep. Most of the time he had only scraps of leftover food to eat. Sometimes the boy shared his food with his grandfather, but once his mother saw him.

"What do you think you're doing?" she asked sharply.

"Grandfather's hungry," the boy answered.

"You leave grandfather alone," said his mother. "We've enough trouble as it is. And don't let me see you wasting good food again."

The boy talked to his grandfather and helped him when he could do so without being found out, but things got worse. The old man coughed and complained. His son and daughter-in-law became more and more short-tempered with him. They had nothing to spare for him and he was in the way.

One night when he should have been asleep, the boy heard his parents whispering together.

"It would have to be a long way away," he heard his mother say. "So far away he couldn't come back."

"Perhaps someone will feel sorry for him," his father said. "If I leave him by the side of the road someone might take him in and feed him."

"They might," said his mother, "but one thing is certain. We can't put up with him any longer. After all, we've got the boy to think of."

"I'll need something to carry him in. I'd better go to market tomorrow and get a good, strong doko."

"Yes," his wife said, "and you can take him tomorrow night when there is no one about. We'll tell the neighbours that he wanted to spend his last days in peace and he's gone to live in a holy place."

When the boy woke in the morning his father had already left for market.

"What are you going to do to grandfather?" he asked.

His mother was startled.

"Nothing," she said. "Why?"

"Yes you are," said the boy. "I know you are. You're going to throw him away."

"That will do!" said his mother angrily. "Whatever put an idea like that in your head? No. No, see grandfather needs a lot of looking after. He needs someone to take care of him. So he's going to a holy place where he can spend his last days in peace."

"Whereabouts?" the boy asked.

"Oh, a long way away. You wouldn't know if I told you. Don't you bother about that," said his mother. "There will be someone to look after him all right. Now you keep out of my way. I'm very busy today."

The boy's father didn't come home until late at night. He had a large, strong doko with him. After he had eaten he gave some food to the old man, then lifted him up and put him in the doko.

"What's this! What do you think you're doing?" cried the old man. "Let me out !"

"Now, now" said his son, "you be quiet. It's all for your own good."

"Where are you taking me? Let me out !" the old man cried again, shaking the side of the doko.

"It's all for your own good, I tell you. You know we can't look after you properly so we're taking you to a place where people can."

"I don't believe you !" shouted the old man. "You get me out of here."

"Oh do please be quiet," his daughter-in-law begged him. "We're only doing what's best for you. You'll like it there."

But the old man continued to shout.

"Liars ! You want to get rid of men, that's what it is."

He turned to his son.

"After all I've done for you," he cried, "and this is how you pay me back. You'll regret it, just you see if you don't"

He shouted more and more. The man ignored him. He set his lips tight and heaved the doko up on his back. The boy watched him as he opened the door to go.

"Father," he said.

"What is it ?" snapped his father.

What can the boy do to stop his father from throwing grandfather away ?

LESSON #4 MODELLING AN ARGUMENTATIVE ESSAY

Approximate time: 60 minutes

OBJECTIVES: Students will be able to cooperatively write sections of an argumentative essay.

STRATEGIES:

1. Show students that this decision making matrix can be used to plan an argumentative essay. An argumentative essay defends a decision through emphasis of the strong points while de-emphasizing the weak points. It also emphasizes the weak points of the unselected alternatives and softens their strong points.
2. Talk through the argumentative essay while pointing to the appropriate cells.
 (see procedure in attached handbook)
3. Divide the class into the same groups as in lesson #3. Using the same organizer as they developed in lesson 3, have each group write an argumentative essay.
4. Bring the large group back together. Have each group present their cooperative essay for evaluation.

LESSON #5 **GUIDED PRACTICE OF AN ARGUMENTATIVE ESSAY**

Approximate time: 60 minutes

OBJECTIVES: Students will be able to make a decision in context using the decision making procedure. Students will be able to write an argumentative essay based on their decision.

STRATEGIES:

1. Recall the decision making procedure.
2. Discuss a topic of interest where a decision must be made:
e.g.
Geography Where can this industry be located ?
History What can be done with Louis Riel ?
Science How will I heat my home ?
Current Events What can be done to prevent oil spills ?
3. Have students clarify the problem situation.
4. Have students determine the decisional question.
5. In small groups, have students discuss appropriate alternatives and criteria.
6. Working independently, have students make a rational decision and write an argumentative essay to defend the decision.
7. Have students read the essay aloud or have a partner evaluate the procedure followed using the decision making matrix.

LESSON #6 POST TEST

Approximate Time: will vary

OBJECTIVES: The students will complete the decision making skill post test.

STRATEGIES:

Refer back to the process you used in the pre-test.

A LITTLE PROCEDURE HANDBOOK

Contains procedures for:

- writing a systematic comparative essay
- writing a systematic comparative essay with relational sentences
- clarifying a concept
- concept enriched model building
- writing a concept-enriched comparative essay
- writing a model-enriched comparative essay
- procedure for generation of criteria from concepts and models
- making a systematic decision
- writing an argumentative essay
- making a concept-enriched decision
- making a model-enriched decision
- developing a systematic correlation

Lincoln County Board of Education

June, 1988

WRITING A SYSTEMATIC COMPARATIVE ESSAY

Planning Procedure

1. Pick a topic.
2. Select sub-topics.
3. Brainstorm
 - a) Write all the words you can think of about the topic.
 - b) Circle similar words.
 - c) Say how the circled words are similar.
4. Fill the cells of the chart.
 1. Number the cells of the chart.

Writing Procedure

Opening Paragraph

1. Write the topic.
2. Write the sub-topics.
3. Write the comparison criteria (characteristics).

Body

1. Write an opening sentence to introduce each criterion.
2. Look at the numbered cell.
3. Look at the heading (sub-topic).
4. Look at the comparison criterion (characteristic).
5. Think of an appropriate sentence and write it.

Conclusion

1. Write a review sentence.
2. Write a reaction sentence.

WRITING A SYSTEMATIC COMPARATIVE ESSAY WITH RELATIONAL SENTENCES

Planning Procedure

1. Pick a topic.
2. Select sub-topics.
3. Brainstorm
 - a) Write all the words you can think of about the topic.
 - b) Circle similar words.
 - c) Say how the circled words are similar.
4. Fill the cells of the chart.
5. Extend the chart to include a summary column.
6. Look for and isolate relational ideas within the chart (e.g. inclusive, exclusive and cause/effect relationships).
7. Put appropriate relational words in the summary column.
8. Number the cells of the chart.

Writing Procedure

Opening Paragraph

1. Write down the topic.
2. Write down the sub-topics.
3. Write down the comparison criteria (characteristics).

WRITING A SYSTEMATIC COMPARATIVE ESSAY WITH RELATIONAL SENTENCES (PAGE 2)



Writing Procedure (continued)

Body

4. Write an opening sentence to introduce each criterion.
5. Look at related ideas that have been isolated within the numbered cells.
6. Look at the relational words stored in the summary column.
7. Look at the heading (sub-topic).
8. Look at the comparison criterion (characteristic).
9. Think of an appropriate relational sentence(s) and write it.

Conclusion

10. Write a review sentence.
11. Write a reaction sentence.

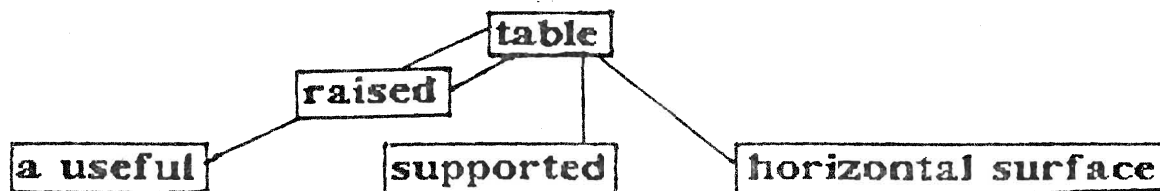
CLARIFYING A CONCEPT



Planning Procedure

1. Think of an example of the concept.
2. Use the word that names the concept in a sentence.
3. Write your own definition of the concept.
4. Match the definition of the concept to an example of the concept and adjust the definition to match the example.
5. Apply step 3 to all parts of the definition until a stable definition is reached.
6. Suggest non-examples of the concept and show how each non-example is lacking some aspect of the defined concept.
7. Suggest new examples of the concept and be able to show how each example fulfils the characteristics of the definition.
8. Develop a diagram of the concept to show each of the characteristics identified in the definition.

e.g.

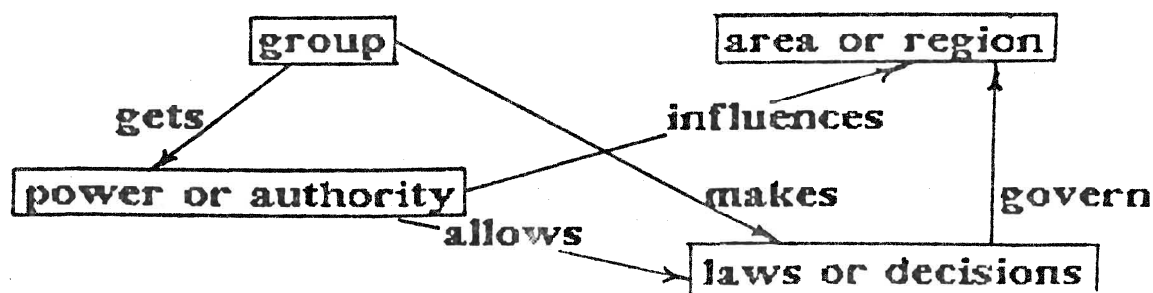


CONCEPT ENRICHED MODEL BUILDING



1. Ask the series of model building questions:
e.g. How does it work?
How does (concept name) work?
What are the parts of (concept name)?
How do the parts fit together?
2. Define the concept.
3. Box the significant words in the concept definition and change each to a noun.
4. Put the boxed nouns into boxes in diagram form.
5. Draw arrows between the boxed nouns to show the relationships.
6. Put an appropriate verb on each line and determine the direction of the arrow.

e.g. definition: A government is a group of people with the legal power or authority to make laws or decisions for an area or region.



WRITING A CONCEPT ENRICHED COMPARATIVE ESSAY

Planning Procedure

1. Pick a topic.
2. Select sub-topics.
3. Clarify the concept.
 - a) Identify the characteristics of the concept.
 - b) State each characteristic as a criterion.
4. Fill the cells of the chart.
5. Number the cells of the chart.

Writing Procedure

Opening Paragraph

1. Write the topic.
2. Write the sub-topics.
3. Define the concept.

Body

4. Look at the numbered cell.
5. Look at the heading (sub-topic).
6. Look at the comparison criterion (part of the concept definition).
7. Think of an appropriate sentence and write it.

Conclusion

8. Write a review sentence.
9. Write a reaction sentence.

WRITING A MODEL ENRICHED COMPARATIVE ESSAY

Planning Procedure

1. Pick a topic.
2. Select sub-topics.
3. Develop a model.
 - a) Change each boxed word to a criterion.
 - b) Enter criteria on the comparison chart.
 - c) Build a second model for each criterion to identify minor criteria.
4. Fill the cells of the chart.
5. Number the cells of the chart.

Writing Procedure

Opening Paragraph

1. Write the topic.
2. Write the sub-topics.
3. Define the concept.
4. Explain the model, using verbs that show relationships to connect components of the model.

Body

1. Look at the comparison criterion (part of the model).
2. Write an opening sentence about the major criterion.
3. Write a sentence(s) about the minor criteria.
4. Look at the headings (sub-topics).
5. Look at the numbered cells.
6. Think of an appropriate relational sentence and write it.

Conclusion

1. Write a review sentence.
2. Write a reaction sentence.

WRITING AN ARGUMENTATIVE ESSAY



Writing Procedure

1. Complete a decision-making chart.

Opening Paragraph

2. State the decisional question.
3. Identify the relevant alternatives.
4. State the selected alternative.
5. Identify the relevant criteria.
6. Explain why some criteria are more important than others.

Body

7. Restate the chosen alternative.
8. State how the chosen alternative meets each criterion.

Repeat the following steps for each alternative that was not chosen.

9. State the weak alternative.
10. Explain why the alternative is weak by referring to each criterion it does not meet.

Conclusion

11. Restate the chosen alternative.
12. Restate how the chosen alternative meets each criterion.

MAKING A CONCEPT-ENRICHED DECISION



Planning Procedure

1. Clarify the nature of the problem to be solved.
2. Write an open-ended decisional question.
3. State all alternatives.
4. Clarify the concept.
 - a) Identify the characteristics of the concept.
 - b) State each characteristic as a criterion.
5. Weight each criterion on a scale of 1 to 3 (3 has the most worth).
6. Consider each alternative and assign a number value in rank order for each alternative.
7. Multiply the weighted criterion number and the number assigned to each alternative.
8. Add up each column vertically.
9. Reconsider close alternatives.
10. State your decision.

MAKING A SYSTEMATIC DECISION



Planning Procedure

1. Clarify the nature of the problem to be solved.
2. Write an open-ended decisional question.
3. State all alternative answers.
4. List all criteria in the form of questions.
5. Weight each criterion on a scale of 1 to 3 (3 has the most worth).
6. Consider each alternative and assign a number value in rank order for each alternative.
7. Multiply the weighted criterion number and the number assigned to each alternative.
8. Add up each column vertically.
9. Reconsider close alternatives.
10. State your decision.


MAKING A MODEL-ENRICHED DECISION



Planning Procedure

1. Clarify the nature of the problem to be solved.
2. Write an open-ended question requiring a decision.
3. State all alternatives.
4. Clarify the organizing concept.
 - a) Box the words that are significant to a model of the concept.
 - b) Change each boxed word to a criterion.
 - c) Enter the criteria on the decision-making chart.
 - d) Develop a model for each criterion and use the significant words of each model to form minor criteria.
5. Weight each criterion on a scale of 1 to 3 (3 has the most worth).
6. Consider each alternative against each weighted criterion and assign a number value.
7. Add up each column vertically.
8. Reconsider close alternatives.
9. State your decision.

PROCEDURE FOR GENERATION OF CRITERIA FROM CONCEPTS AND MODELS



a) Procedure for generating criteria from concepts: for use in making comparisons and decision making.

1. Clarify the concept.
2. Draw a concept diagram to separate the critical characteristics.
3. Place each critical characteristic in a criterion cell of the matrix.
4. Adjust each critical characteristic as needed to clearly identify a criterion.

b) Procedure for generating criteria from models: for use in making comparisons and decision making.

1. Develop the model.
2. Combine the boxed components of the model with the appropriate arrow component to form a criterion.
3. Place the criterion in the appropriate cell of the matrix.

DEVELOPING A SYSTEMATIC CORRELATION



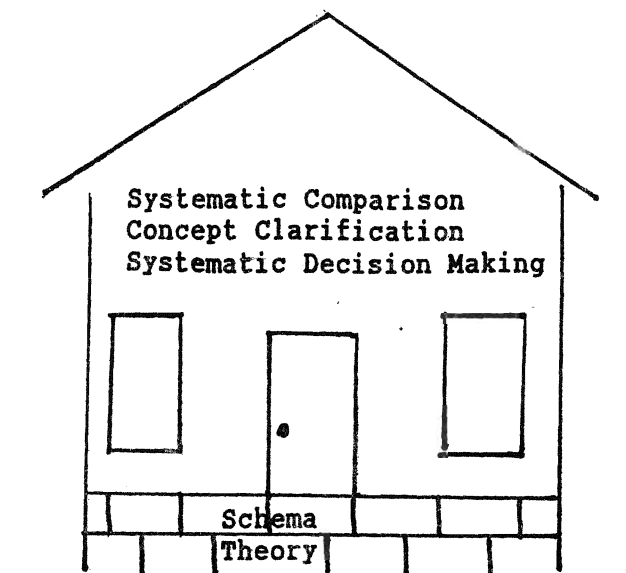
Procedure

1. Define the term *correlation*.
2. Think of an example of correlation.
3. Write a correlational question for the specific problem
(e.g. What relationship is there between _____ and _____?)
4. State the controlling factor.
5. Draw, number and title the x axis (the controlling factor) of a correlation graph.
6. Draw, number and title the y axis of a correlation graph.
7. Plot the data on the graph.
8. Draw the "line of best fit" on the graph.
NOTE: The line of best fit is one that identifies any dominant pattern on a correlation graph.
9. Answer the question posed in step 3 by interpreting "the line of best fit".
(e.g. As _____ increases/decreases, the _____ increases/decreases).
10. Identify exceptions (anomalies) to "the line of best fit".
11. Explain any/all exceptions (anomalies).
12. Make predictions based on dominant patterns.

APPENDIX C

Summary of the Thesis: Effectiveness of Instructional
Strategies Based on Schema Theory on Attention Deficit
Disorder Children.

Effectiveness of Instructional Strategies
Based on Schema Theory
on Attention Deficit Disorder Children



Inattentive

- Often fails to finish things
- Often doesn't seem to listen
- Easily distracted
- Has difficulty sustaining attention on schoolwork

Has difficulty sticking to a play activity (hobbies)



Hyperactive

- Runs, climbs excessively
- Fidgets excessively
- Has difficulty staying seated
- Moves about excessively during sleep
- Is always "on the go"

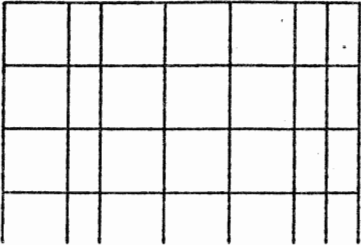
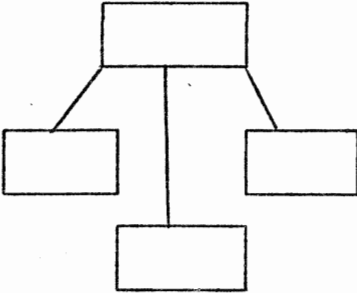
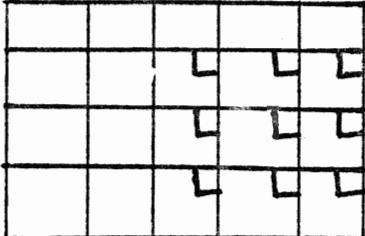
Impulsive

- Often acts before thinking
- Shifts excessively from one activity to another
- Has difficulty organizing work
- Needs a lot of supervision
- Frequently calls out in class
- Has difficulty waiting turns

RATIONALE

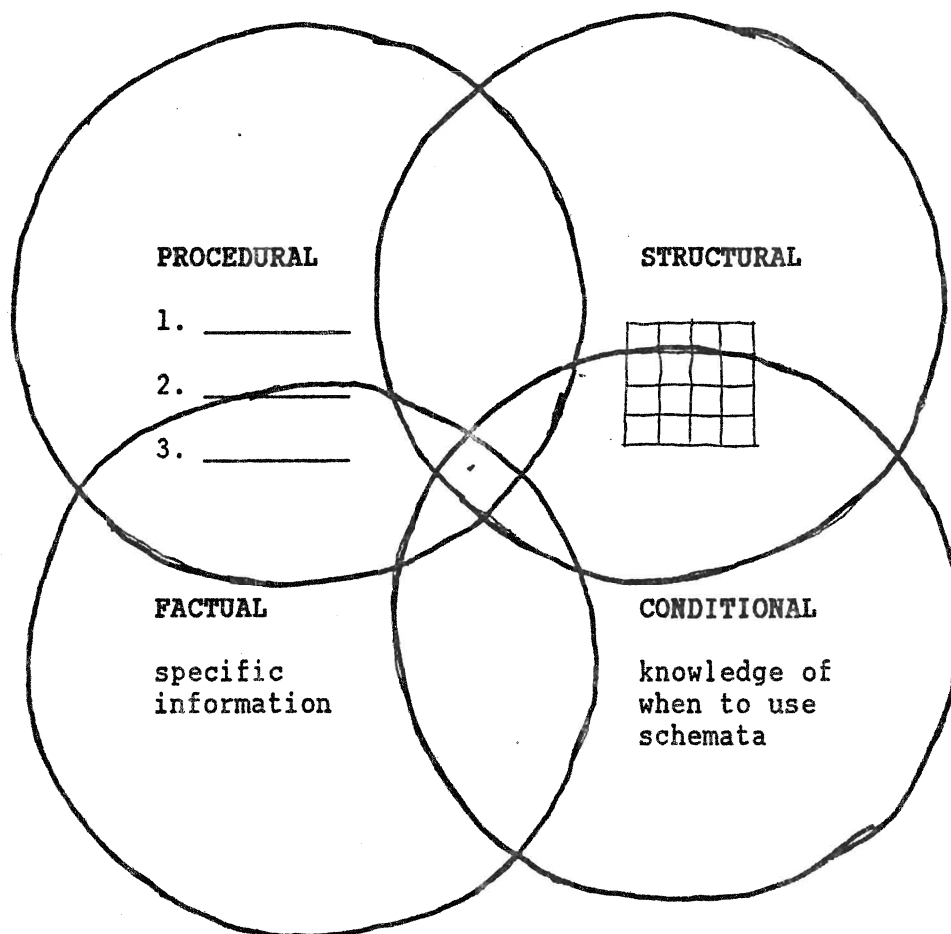
- Historically, Attention Deficit Disorder children have been underachievers.
- Today's classroom teachers are responsible for meeting the needs of each of their students. This includes students who are characterized by Attention Deficit Disorder.
- Educators generally do not understand the causes and/or treatments/programs for Attention Deficit Disorder.
- Educators and ADD students need programs which will address the needs and increase the learning of ADD students. Educators and students will benefit by being involved in programs which increase the learning of students characterized by ADD.

These refer to repeatable mental actions with underlying procedures which subsume simple skills required to perform a task.

SYSTEMATIC COMPARISON	CONCEPT CLARIFICATION	SYSTEMATIC DECISION MAKING
<p>What are the interesting characteristics?</p>  <ol style="list-style-type: none"> 1. Choose a topic. 2. Choose sub-topics. 3. Brainstorm to get the criteria. 4. Fill in the cells. 5. Number the cells. 	<p>What is it?</p>  <ol style="list-style-type: none"> 1. Choose a concept. 2. Use the concept in a sentence. 3. Define the concept. 4. Test the definition with examples and non-examples. 5. Adjust the definition. 6. Retest the definition. 7. Establish the definition as stable. 8. Box the critical characteristics. 9. Change critical characteristics to nouns. 10. Complete the diagram. 	<p>Which choice should I make?</p> <p align="center">Wt.</p>  <ol style="list-style-type: none"> 1. Establish a decisional question. 2. Identify the options. 3. Identify the criteria through brainstorming. 4. Weight the criteria. 5. Rank the options. 6. Multiply weight X rank to fill the cells. 7. Add each column vertically. 8. Check close options. 9. State the decision.

SCHEMA

Schema is a highly structured mental organization of one's knowledge about a particular topic or thing. (Northeastern Region, 1988)



THE PROBLEM

What is the effect of the instructional use of the complex skills of systematic comparison, concept clarification, and systematic decision making on students characterized by Attention Deficit Disorders (inattentiveness, impulsivity, hyperactivity)?

CHILD	PROGRAM	OUTCOME
inattentive impulsive hyperactive (?)	It is based on Schema Theory which is highly organized and focused. Schema theory enables attention that is specific and localized. This program facilitates learning through instruction which builds structural, procedural and conditional schemata.	Increased learning?

HYPOTHESES

H-1. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Comparison.

H-2. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Concept Clarification.

H-3. There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Decision Making.

HYPOTHESES

H-4. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Comparison than for Non-Attention Deficit Disorder children.

H-5. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Concept Clarification than for Non-Attention Deficit Disorder children.

H-6. There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Decision Making than for Non-Attention Deficit Disorder children.

LITERATURE REVIEW

1. About 6% of school age children are characterized by Attention Deficit Disorder.
2. Causes of Attention Deficit Disorder are many and varied, e.g. genetics, chemical imbalances related to neurotransmitter substances in the brain, developmentally delayed use of inner language, certain social relationships and experiences acting on a person predisposed to A.D.D.
3. Treatments include biofeedback, fluorescent lighting, special diets, behaviour modification, structured environments, and drug therapy.

LITERATURE REVIEW (cont'd)

4. Attention Deficit Disorder can have an extremely negative impact on the lives of many people.
 - underachievement academically
 - antisocial behaviours cause lack of friendships
 - other family members suffer
5. Information processing programs to some degree have ameliorated the learning of students characterized by Attention Deficit Disorder.
6. It appears that schema theory can be used as a basis to build information processing programs in order to increase learning.

SAMPLE

- Twelve grade seven classes were randomly chosen to be sampled.
- Seventeen students were identified as being characterized by Attention Deficit Disorder.
- From the remaining students not characterized by Attention Deficit Disorder, seventeen were randomly chosen for the study.

INSTRUMENTATION

- Conner's Abbreviated Teacher Rating Scale
- Series of questions established by the researcher.
- Pretests and posttests for systematic comparison, concept clarification, and systematic decision making.

Table 2: CONNERS' ABBREVIATED TEACHER RATING SCALE

Child's Name: _____

TEACHERS' OBSERVATIONS

Information obtained _____ By _____
Month Day Year

Observation	Degree of Activity			
	Not at all 0	Just a little 1	Pretty much 2	Very much 3
1. Restless or overactive				
2. Excitable, impulsive				
3. Disturbs other children				
4. Fails to finish things he starts, short attention span				
5. Constantly fidgeting				
6. Inattentive, easily distracted				
7. Demands must be met immediately - easily frustrated				
8. Cries often and easily				
9. Mood changes quickly and drastically				
10. Temper outbursts, explosive and unpredictable behaviour				

OTHER OBSERVATIONS OF TEACHER (Use reverse side if more
space is required.)Source: C. Keith Conners, "A teacher rating scale for use
in drug studies with children." The American Journal of
Psychiatry, 1969.

TEACHER DISCUSSION QUESTIONS

1. Describe the student's organization in a) their desks, b) their notebooks.
2. What is their problem solving in math like?
3. Do they have friends? close? a lot?
4. Does this student have problems in following rules? How are these problems, if any, manifested?
5. What is this student's reaction to discipline?
6. Does this student behave in age appropriate manners?
7. Does this student work well in groups?
8. Does this student seek attention? How?
9. Has he/she to your knowledge been identified as learning disordered in any manner?
10. Is he/she involved in any special programming?
11. Is he/she on any special medication?

DATA ANALYSIS

- Statistical Package for the Social Sciences (SPSSPC)
- Analyses included descriptive frequencies, t-tests, both paired and independent, and correlations.

HYPOTHESIS #1

There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Comparison.

CONFIRMED

HYPOTHESIS #2

There is a significant difference in performance between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Concept Clarification.

CONFIRMED

HYPOTHESIS #3

There is a significant difference between Attention Deficit Disorder children and Non-Attention Deficit Disorder children on the pretest of Systematic Decision Making.

CONFIRMED

HYPOTHESIS #4

There will be significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Comparison than for Non-Attention Deficit Disorder children.

CONFIRMED

$$\frac{7.65}{29.71} = 1:3.88$$

$$\frac{14.29}{39.94} = 1:2.79$$

HYPOTHESIS #5

There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Concept Clarification than for Non-Attention Deficit Disorder children.

CONFIRMED

$$\frac{1.35}{8.94} = 1:6.62$$

$$\frac{2.06}{11.12} = 1:5.40$$

HYPOTHESIS #6

There will be a significantly higher ratio of gain for Attention Deficit Disorder children on the posttest of Systematic Decision Making than for Non-Attention Deficit Disorder children.

CONFIRMED

$$\frac{5.29}{34.47} = 1:6.5$$

$$\frac{10.94}{44.29} = 1:4.05$$

SUMMARY**IMPLICATIONS****CONCLUSIONS****RECOMMENDATIONS**

SUMMARY

- The Interdisciplinary Skills Program which has been based on schema theory improved attending behaviours because it created a specific focus for the learner by building structural, procedural and conditional schemata.
- Since schema theory enables attention that is specific and localized and develop an awareness of the elements within the focus, learning was increased.
- Increased learning was significant for both the Attention Deficit Disorder group and the Non-Attention Deficit Disorder group.
- It was particularly interesting to note that the ratio of gain for the three skills was higher for the Attention Deficit Disorder group than for the Non-Attention Deficit Disorder group.

IMPLICATIONS

- This study supports the idea that information processing skills should be the core for subjects rather than content as the core.
- This study has shown that all students involved in this program benefitted. Therefore, the same methodologies and learnings can be used for both groups.
- The classes receiving instruction were heterogeneous in nature. This study has shown that special needs classes were not necessary for Attention Deficit Disorder children when teaching information processing skills based on schema theory.
- It has been demonstrated that grade seven students are very capable of learning these skills at this age.

CONCLUSIONS

- Learners who are inattentive and impulsive can learn at a rate almost equal to children who are not characterized by inattentiveness and impulsivity.
- The same methodologies and learnings can be taught effectively to Attention Deficit Disorder children and Non-Attention Deficit Disorder children.
- These skills were learned easily at the grade seven level.
- The teaching of these skills in heterogeneous classes produced significant gains for Attention Deficit Disorder children and Non-Attention Deficit Disorder children.

RECOMMENDATIONS

- Examine the level at which these complex skills could best be taught.
- Examine the learning differences between male and female Attention Deficit Disorder children.
- Investigate the differences in the level of frustration for Attention Deficit Disorder children taught to use complex skills.
- Examine whether or not both Attention Deficit Disorder children and Non Attention Deficit Disorder children can generalize these skills.
- Investigate professional development for educators teaching complex skills.
- Replicate this research with a larger/different population.